

No. 2314

6

United States
Circuit Court of Appeals

For the Ninth Circuit.

Transcript of Record.
(IN TWO VOLUMES)

PACIFIC PHONOGRAPH COMPANY, a Corpora-
tion,

Appellant,

vs.

SEARCHLIGHT HORN COMPANY, a Corpora-
tion,

Appellee.

VOLUME II.
(Pages 226 to 407, Inclusive.)

Upon Appeal from the United States District Court
for the Northern District of California,
Second Division.

FILMER BROS. CO. PRINT, 330 JACKSON ST., S. F., CAL.

FILED

SEP 26 1913

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VOLUME II.
(Pages 226 to 407, Inclusive.)

Upon Appeal from the United States District Court
for the Northern District of California,
Second Division.

*In the District Court of the United States for the
Northern District of California, Second Division.*

IN EQUITY—No. 18.

SEARCHLIGHT HORN COMPANY,

Plaintiff,

vs.

PACIFIC PHONOGRAPH COMPANY,

Defendant.

Citation [on Appeal (Original)].

The President of the United States to Searchlight Horn Company, a Corporation, Plaintiff, and Messrs. Miller & White, Its Attorneys, Greeting.

You are hereby cited and admonished to be and appear at the United States Circuit Court of Appeals for the Ninth Judicial Circuit, to be held at the city of San Francisco, State of California, on the 2d day of August, 1913, pursuant to an order allowing an appeal entered in the clerk's office of the United States District Court in and for the Northern District of California, in that certain action numbered "In Equity, No. 18," in which Searchlight Horn Company, a corporation, is plaintiff and in which Pacific Phonograph Company, a corporation, is defendant, to show cause, if any there be, why the order granting preliminary injunction, heretofore entered in this cause in said United States District Court should not be corrected, reversed and annulled and why speedy justice should not be done to the parties affected in that behalf. [210]

WITNESS the Honorable EDWARD D. WHITE, Chief Justice of the Supreme Court of the United States of America this 2d day of July and of the Independence of the United States, the one hundred twenty-seventh.

WM. C. VAN FLEET,
Judge of the United States District Court. [211]

Due service of the within Citation by copy is hereby admitted this 2d day of July, 1913.

MILLER & WHITE,
Attorney for Plaintiff.

[Endorsed]: No. 18. In Equity. In the District Court of the United States for the Northern District of California, Second Division. Searchlight Horn Company, Plaintiff, vs. Pacific Phonograph Company, Defendant. Citation. Filed Jul. 3, 1913. W. B. Maling, Clerk. By J. A. Schaertzer, Deputy Clerk. [212]

[Endorsed]: No. 2314. United States Circuit Court of Appeals for the Ninth Circuit. Pacific Phonograph Company, a Corporation, Appellant, vs. Searchlight Horn Company, a Corporation, Appellee. Transcript of Record. Upon Appeal from the United States District Court for the Northern District of California, Second Division.

Received and filed August 30, 1913.

FRANK D. MONCKTON,
Clerk of the United States Circuit Court of Appeals
for the Ninth Circuit.

By Meredith Sawyer,
Deputy Clerk.

*In the United States Circuit Court of Appeals for the
Ninth Circuit.*

PACIFIC PHONOGRAPH COMPANY,
Appellant,

vs.

SEARCHLIGHT HORN COMPANY,
Appellee.

**Order Extending Time to File Record and to Docket
Cause.**

Good cause appearing therefor, it is ordered that the appellant in the above-entitled cause may have to and including the 1st day of September, within which to file its record on appeal and to docket the cause in the United States Circuit Court of Appeals for the Ninth Circuit.

Dated August 1, 1913.

WM. W. MORROW,
United States Circuit Judge.

[Endorsed]: No. 2314. United States Circuit Court of Appeals for the Ninth Circuit. Order Under Rule 16 Enlarging Time to ——— to File Record Thereof and to Docket Case. Filed Jul. 31, 1913. F. D. Monckton, Clerk. Refiled Aug. 30, 1913. F. D. Monckton, Clerk.

**U. S. District Court,
Northern Dist. of Cal.
Second Division.**

Eq. No. 18.

8.

SEARCHLIGHT HORN COMPANY,
Plaintiff,

vs.

PACIFIC PHONOGRAPH COMPANY,
Defendant.

Eq. No. 7.

SEARCHLIGHT HORN COMPANY,
Plaintiff,

vs.

BABSON BROS., INC.,
Defendant.

**Defendant's Exhibits, United States and Foreign Patents,
Opposing Motions for Preliminary Injunction.**

HENRY C. SCHAERTZER,
Solicitor for Defendant, Humboldt Bank Bldg., San
Francisco, Cal.

LOUIS HICKS,
Of Counsel for Defendant.

[Endorsed]: Filed Jun. 16, 1913. W. B. Maling, Clerk. By J. A. Schaertzer, Deputy Clerk.

No. 2314. U. S. Circuit Court of Appeals for the Ninth Circuit. Defendant's Exhibits U. S. and Foreign Patents Opposing Motions for Preliminary Injunction. Received Sep. 2, 1913. F. D. Monekton, Clerk.

DESIGN.

F. S. SHIRLEY.

GLASSWARE.

No. 8,824.

Patented Dec. 7, 1875.



Witnesses:
J. B. Bond
J. Clark

Inventor:
Frederick S. Shirley
By *Wm. H. Hich*
His Atty.

UNITED STATES PATENT OFFICE.

FREDERICK S. SHIRLEY, OF NEW BEDFORD, MASSACHUSETTS.

DESIGN FOR GLASSWARE.

Specification forming part of Design No. 8,824, dated December 7, 1875; application filed November 24, 1875.
[Term of Patent 3½ years.]

To all whom it may concern:

Be it known that I, FREDERICK S. SHIRLEY, of New Bedford, Bristol county, in the State of Massachusetts, have invented a Design for Glass-Vase Bodies, of which the following is a specification:

The nature of my design is fully shown in the accompanying photographic illustration, to which reference is made.

A is the glass-vase body, made of an elongated bell shape, or like a flaring cone, and finished at its mouth or upper edge with flaring curved lips or scallops, as shown at *a*. The exterior surface of this vase-body is ground off to produce a lusterless appearance. B B are ribs, which extend from the line of the base up along the exterior surface of the vase body to the upper edge or mouth, terminating there, one at the center of each of the flaring lips or scallops. These ribs are nicked or serrated throughout their entire length, and are highly polished.

This glass-vase body is intended to be mounted on a standard or base of metal or other material.

I prefer to use clear or colorless glass for the body, but either the surface of the vase or the ribs, or both, may be colored; but I do not consider the coloring to be an essential element in my design.

I am aware that glass vases having a bell or cone shape, and with flaring scalloped lips and longitudinal ribs, are not new, and I do not claim them. The distinctive character of my design is found in serrated and highly-polished ribs extending the length of the vase-body, the surface of which is ground off or lusterless.

What I claim as my invention is—

The design for a glass-vase body, in which serrated and highly-polished ribs extend longitudinally along the ground or lusterless surface of the body, substantially in the manner described.

FREDERICK S. SHIRLEY.

Witnesses:

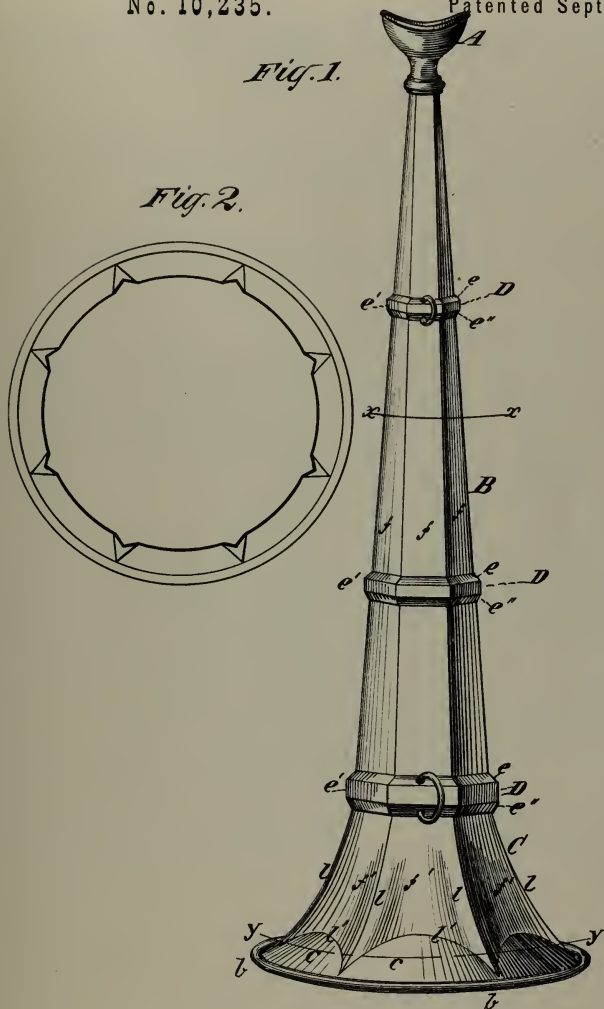
WENDELL H. COBB,
GEORGE F. TUCKER.

DESIGN.

E. CAIRNS.
SPEAKING-TRUMPETS.

No. 10,235.

Patented Sept. 11, 1877.

*Fig. 1.**Fig. 2.**Fig. 3.*

Witnesses
 John Becker
 Fred. Haynes

Edward Cairns
 by his Attorneys
 Brown & Allen

UNITED STATES PATENT OFFICE.

EDWARD CAIRNS, OF MORRISTOWN, NEW JERSEY.

DESIGN FOR SPEAKING-TRUMPETS.

Specification forming part of Design No. **10,235**, dated September 11, 1877; application filed August 24, 1877.
[Term of Patent 7 years.]

To all whom it may concern:

Be it known that I, EDWARD CAIRNS, of Morristown, in the county of Morris and the State of New Jersey, have originated and designed a Design for Speaking-Trumpets, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, making part of this specification.

Figure 1 in the drawing represents a perspective view of a speaking-trumpet embodying my design.

A represents the mouth-piece, B the tube, and C the bell, of the trumpet. The tube B has the form of a truncated polygonal pyramid, extending from the bell C to the mouth-piece A, and presents upon its outer surface the equal and geometrically-similar facets *f*, arranged in such manner that a cross-section made in any part of said tube at right angles with its central longitudinal axis will be a regular equilateral polygon, as shown in Fig. 2.

The bell C is, in form, partly pyramidal and partly conical. The flaring polygonal part comprises external curved facets *f'*. Said facets *f'* are extensions of the facets *f*, and their lines of junction *l* extend to and termi-

nate at the bead *b* at the outer margin of said bell. Said facets *f'* are, moreover, slightly concave on their outer surfaces, from which conformation their lines of intersection *l'* with the round flaring part *c c c* of the said bell are marked curves, giving the entire border of the flaring polygonal part where it joins the said round flaring part a scalloped form. A cross-section through the said conical and pyramidal parts of the bell gives the figure shown in Fig. 3. Upon the tube B are formed or attached at intervals polygonal bands D, having three sets of flat facets, *e e' e''*, so arranged that a cross-section of any of said bands made at right angles with any of said facets will give the figure of a trapezoid the not parallel sides of which are equal.

I claim—

The design for a speaking-trumpet consisting of the polygonally-formed tube B, the combined pyramidal and conical bell C, and the faceted bands D, as herein shown and described.

EDWD. CAIRNS.

Witnesses:

FRED. HAYNES,
BENJAMIN W. HOFFMAN.

No. 34,907.

Patented Aug. 6, 1901.

C. McVEETY & J. F. FORD.

SHIP'S VENTILATOR.

(Application filed July 10, 1901.)

FIG. 1.

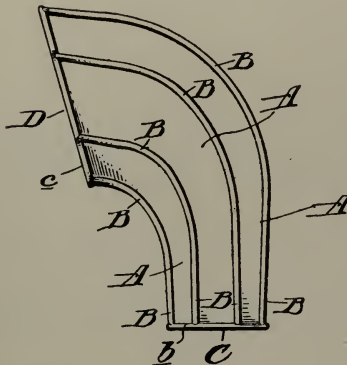


FIG. 2.

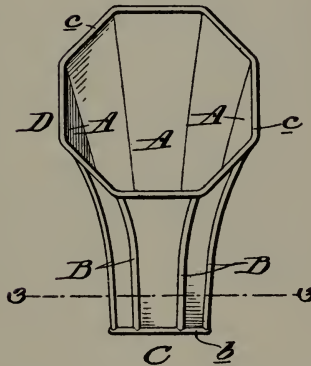
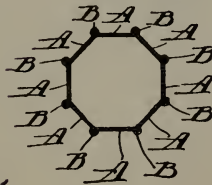


FIG. 3.



WITNESSES:

Boroman S. Stetling
Richard H. Sharp

INVENTORS:

Charles McVeety
John F. Ford
By their attorney
Walter W. Calumore

UNITED STATES PATENT OFFICE.

CHARLES McVEETY AND JOHN F. FORD, OF PHILADELPHIA, PENNSYLVANIA.

DESIGN FOR A SHIP'S VENTILATOR.

SPECIFICATION forming part of Design No. 34,907, dated August 6, 1901.

Application filed July 10, 1901. Serial No. 67,794. Term of patent 14 years.

To all whom it may concern:

Be it known that we, CHARLES McVEETY and JOHN F. FORD, citizens of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented and produced a new and original Design for Ships' Ventilators, of which the following is a specification.

Referring to the accompanying drawings, forming part of this specification, Figure 1 illustrates a side elevation of a ventilator, showing our new design. Fig. 2 represents a front elevation of the same, and Fig. 3 shows a horizontal section taken on line 3 3 of Fig. 2.

As shown in the drawings, the leading or material feature of our design consist of a series of plates A flat in cross-section, as shown in Fig. 3. The plates have arranged at the point of junction ribs B, and at the base C and mouth D are arranged ribs b and c, which intersect the ribs B.

The general contour of the ventilator is that of a curved tapering figure in the form of a cornucopia, being octagonal in cross-section and having convex ribs at the base and 25 mouth, and similar ribs at the intersection of the plates, forming the walls of the ventilator.

Having described our invention, what we claim as new, and desire to secure by Letters 30 Patent, is—

The design for a ventilator substantially as herein shown and described.

In testimony whereof we affix our signatures in presence of two witnesses.

CHARLES McVEETY.
JOHN F. FORD.

Witnesses:

D. P. S. GARWOOD,
H. E. COUGHLIN.

Impr'd Bell

PATENTED

DEC 17 1867

72422

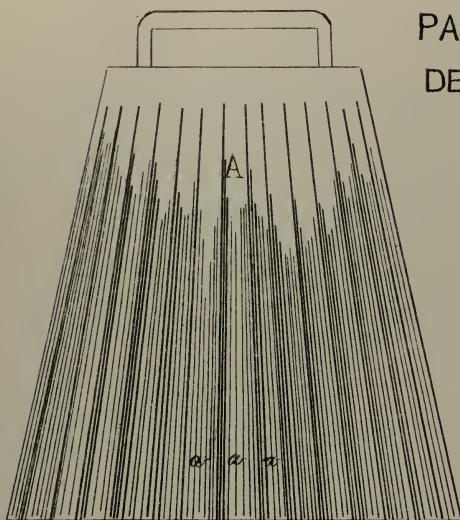


Figure 1.

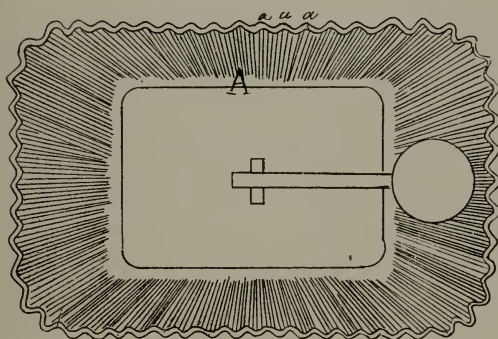


Figure 2.

Witnesses

J. C. White

J. C. des Granges

Inventor.

G. S. Saxton

By his Atty.

W. Randolph & Co.

United States Patent Office.

GEORGE S. SAXTON, OF ST. LOUIS, MISSOURI.

Letters Patent No. 72,422, dated December 17, 1867.

IMPROVEMENT IN MANUFACTURE OF CORRUGATED BELLS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, GEORGE S. SAXTON, of the city and county of St. Louis, and State of Missouri, have invented a new and useful Improvement in Bells; and I do hereby declare that the following is a full and clear description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

This invention relates to an improvement in bells by corrugating the lower portion of their sides or bodies; the object of which improvement is twofold in its nature: Firstly, it is for the purpose of increasing the tin-tinabular quality of the bell, and the volume of the sound issued therefrom; and, secondly, it is for the purpose of constructing small bells of sheet metal, and of one single piece, the corrugations of the sides of the bell taking up the excess of the metal toward the base, and thus rendering it possible to form a perfect pressed bell of one single piece.

To enable those skilled in the art to make and use my improved bell, I will proceed to describe its construction and operation.

Figure 1 of the drawings is a side elevation of one of the improved bells.

Figure 2 is a bottom plan of the same.

The general form of the bell A may be in any pattern that is best adapted to the purposes for which it is intended. The only feature in which it differs from all other bells is in the corrugations *a*, which commence in large folds near or at the bottom of the bell, and, as they rise, gradually diminish toward the top, at which place they entirely vanish. These folds or corrugations *a* increase the lower or vibratory portion of the bell to such an extent as to very perceptibly increase the volume of sound produced by its agitation. The chief object of the improvement, however, is to form the bell in such a manner that it may be constructed by pressing, with suitable dies, a single sheet of metal into the proper form. This of course is confined to small bells, and the result is to produce a better bell at a cheaper price. The depth of the bell of course precludes the idea of pressing a bell into the proper form without taking up the excess of metal in this manner.

Having described my invention, I claim as a new article of manufacture—

The bell A, when it is formed in corrugations, substantially in the manner and for the purpose set forth.

GEO. S. SAXTON.

Witnesses:

M. RANDOLPH,

T. E. WHITE.

W. H. BARNARD.

Lamp-Chimney.

No. 165,912.

Patented July 27, 1875.

FIG. I.

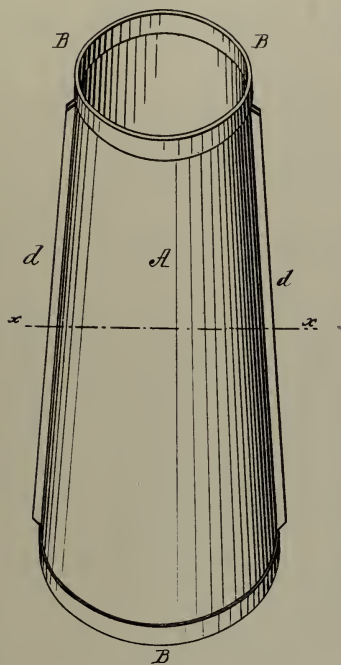


FIG. III.

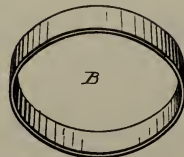


FIG. II.

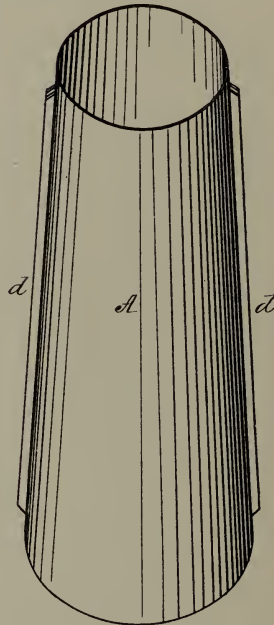


FIG. V.

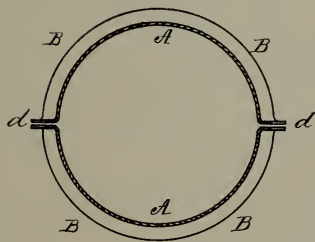
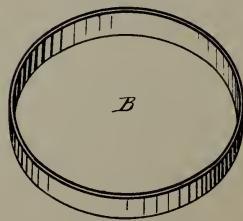


FIG. IV.



WITNESSES:

J. G. Coombs
W. C. Norris

INVENTOR

William H. Barnard

By James L. Norris

Atty.

UNITED STATES PATENT OFFICE.

WILLIAM H. BARNARD, OF SEDALIA, MISSOURI.

IMPROVEMENT IN LAMP-CHIMNEYS.

Specification forming part of Letters Patent No. **165,912**, dated July 27, 1875; application filed January 4, 1875.

To all whom it may concern:

Be it known that I, WILLIAM H. BARNARD, of Sedalia, in the county of Pettis and State of Missouri, have invented certain new and useful Improvements in Lamp-Chimneys, of which the following is a specification:

My invention relates to certain improvements in that class of lamp-chimneys which are constructed of two longitudinal sections, united at their edges, and properly bound or clasped together, for the purpose of allowing for the expansion and contraction of the glass when subjected to sudden changes of temperature, and preventing the chimney from cracking or breaking.

The object of my invention is to secure a more perfect joint at the point of union of the two sections, and provide a more secure and reliable device for binding the two sections together, than has been heretofore accomplished in the chimneys of this class, as ordinarily constructed; and my invention consists in constructing a chimney of two longitudinal sections or parts, as usual, each section having a longitudinal flange on its edges, which unite and form a longitudinal projection or edge on the outside of the chimney when the sections are bound together.

By this construction a broad face is obtained along the edges of each section, which form, when properly ground and placed together, a perfect joint.

In the drawings, Figure 1 is a perspective view of my improved lamp-chimney; Fig. 2, a similar view of the same with the end ferrules removed. Figs. 3 and 4 are detached views of the top and bottom ferrules, respectively; and Fig. 5 is a section on line *xx* of Fig. 1.

The letters A A represent the sections composing the chimney. Along the edges of each section, on the outside, a longitudinal flange, *d*, is formed. The faces of these flanges

are accurately ground, so as to form a perfectly tight joint when the sections are joined together. The flanges do not extend quite to the end of the sections, but terminate a short distance from said ends, in order to allow the sections to set into the annular ferrules which bind them together. These annular ferrules are represented by the letters B B. They are constructed so as to grasp the edges of the sections at their ends, both on the inside and outside, and thus firmly bind them together.

It will be seen that by the above-described construction of the sections a broad face will be formed along the edges of the sections at the point of union, which will allow said edges to be readily and accurately ground, forming a perfect joint throughout the entire length of the sections, which it has hitherto been found impossible to obtain.

The annular ferrules, by grasping both the outside and inside of the chimney, will prevent any slipping of the sections, and thus necessarily bind them in place.

The chimneys thus constructed are admirably adapted for packing for transportation, as the sections will nest together, occupying but little room.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

A lamp-chimney constructed of two sections, each of which is provided with laterally-projecting flanges, substantially as described, whereby, when the sections are placed together, a longitudinal projection is formed and a perfect joint secured, as set forth.

In testimony that I claim the foregoing I have hereunto set my hand and seal.

WILLIAM H. BARNARD. [L. S.]

Witnesses:

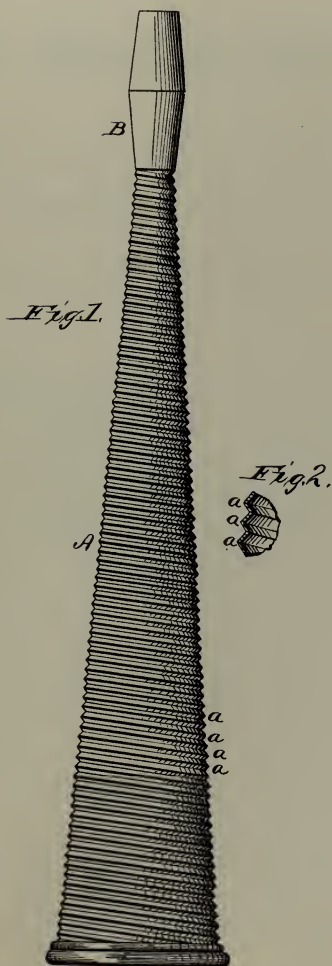
J. HALL BROWNE,
J. S. JACKSON.

C. W. FALLOWS.

TOY BLOW HORN.

No. 181,159.

Patented Aug. 15, 1876.



WITNESSES
Francis L. Outland
C. L. Erick.

INVENTOR
Chas W. Fallows
By Alexander Haason
Attorneys

UNITED STATES PATENT OFFICE.

CHARLES W. FALLOWS, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN TOY BLOW-HORNS.

Specification forming part of Letters Patent No. **181,159**, dated August 15, 1876; application filed June 27, 1876.

To all whom it may concern:

Be it known that I, CHARLES W. FALLOWS, of Philadelphia, in the county of Philadelphia, and in the State of Pennsylvania, have invented certain new and useful Improvements in Sheet-Metal Blow-Horns; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

The nature of my invention consists in the construction of a blow-horn, as hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to manufacture and use the same, I will now proceed to more fully describe the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents a side elevation of my blow-horn, and Fig. 2 represents a small section of the body.

The body A of the horn is made of corrugated sheet metal, in the usual tapering form, and is provided with a mouth-piece, B, having the usual reed. The metal which forms the body is cut in proper shape, and then passed between rollers or dies and crimped or corrugated. These corrugations are preferably

made on an incline, so that when the blank sheet is bent into tubular shape the corrugations *a a* will be on a short spiral, as shown in the drawings.

It is well known that the thinner the metal of which such horns are made the sharper the tone; but in cases where the horns are plain or smooth, and made of light metal, they do not have the requisite strength or keep proper shape, and in a short period would not be merchantable or present a neat appearance.

I claim for my invention that lighter and cheaper metal can be used, and that the same is more easily worked into proper shape by being light, that it costs less in construction, and that the sound made by the mouth-piece and reed is sharper than in the usual blow-horn made of plain or smooth metal.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

A blow-horn made of corrugated sheet metal, for the purposes herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 14th day of June, 1876.

CHARLES W. FALLOWS.

Witnesses:

JAMES FALLOWS,
ANSON EATON.

(No Model.)

C. R. PENFIELD.

METALLIC BARREL.

No. 362,107.

Patented May 3, 1887.

Fig. 1.

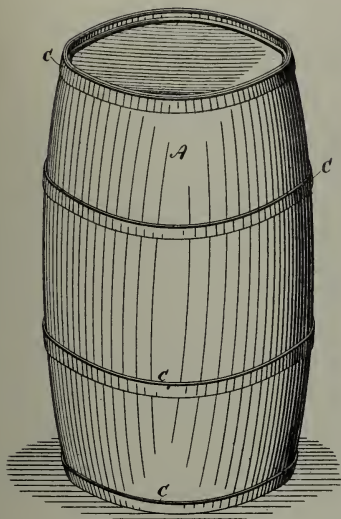


Fig. 2.

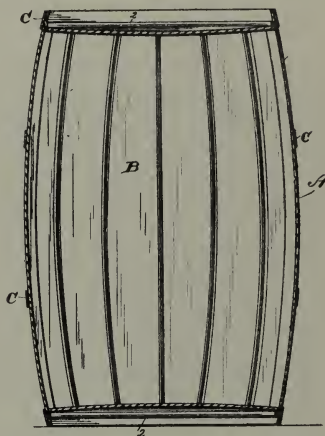


Fig. 13.

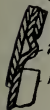


Fig. 3.

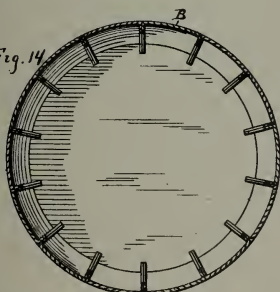


Fig. 14.

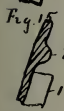
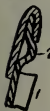


Fig. 4.



Fig. 5.

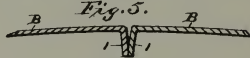


Fig. 6.



Fig. 7.

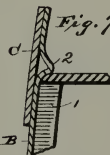


Fig. 8.

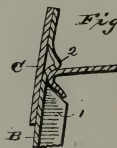


Fig. 9.

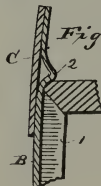


Fig. 10.

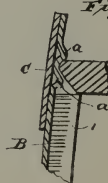


Fig. 11.

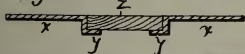
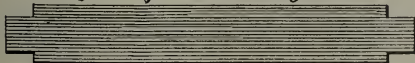


Fig. 12.



Witnesses.

Chas. R. Burr.

A. Stewart.

Inventor.

Charles R. Penfield
by Chas. & Chas.
his Attorneys.

UNITED STATES PATENT OFFICE.

CHARLES R. PENFIELD, OF ROCHESTER, NEW YORK.

METALLIC BARREL.

SPECIFICATION forming part of Letters Patent No. 362,107, dated May 3, 1887.

Application filed September 2, 1886. Serial No. 212,510. (No model.)

To all whom it may concern:

Be it known that I, CHARLES R. PENFIELD, of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Metallic Barrels; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the figures and letters of reference marked thereon.

My invention has for its object to provide a packing and storing barrel constructed of metal that shall resemble in appearance the ordinary wooden barrel, but shall be much stronger, lighter, and altogether more desirable for use, whether used as a receptacle for liquids or as a dry or "slack" barrel; and it consists of a barrel constructed of metallic staves fashioned somewhat after the manner of wooden staves and fastened together, preferably, by hoops, or which may be soldered, or hooped and galvanized, if desired; and it further consists in certain novelties of construction and combinations of parts, which will be herein-
after fully described, and pointed out in the claims at the end of this specification.

In the drawings, Figure 1 is a view of a barrel constructed in accordance with my invention; Fig. 2, a longitudinal and Fig. 3 a cross section of the same. Fig. 4 is a perspective view of one of the staves; Figs. 5 and 6, views of the joints between the edges of the staves; Figs. 7, 8, 9, 10, and 11, views of modifications of the croze and means of fastening the heads therein, and Fig. 12 a view of the stave-blank. Figs. 13, 14, and 15 are views exhibiting various means of strengthening the chine.

Similar letters of reference in the several figures indicate the same parts.

A represents a barrel constructed in accordance with my invention, resembling, as far as outside appearance is concerned, an ordinary wooden barrel, constructed of the staves B, and fastened together by means of hoops C, as ordinarily.

The staves B are made from a blank of sheet metal, preferably steel, such as shown in Fig. 12, with the side flanges, 1 1, being forced by powerful pressure into the shape shown in Fig. 4—that is, they are bent transversely to give

the requisite amount of bilge, and then are given a slight longitudinal bending, so as to strengthen them sufficiently, and also to give the barrel which they are to form the proper rotundity. At the same or another operation the side flanges, 1 1, are bent up to nearly right angles with the body of the staves. Corrugations or ribs 2 2 are next formed near the ends of the blank, a short distance beyond the ends of the side flanges, and this space between the corrugations and the ends of the flanges forms the croze, as will be further on explained. These bending operations, though described *seriatim*, are, it will be understood, to be performed by one operation by some powerful pressing device—such, for instance, as a hydraulic press—suitable dies of course being employed to accomplish the purpose. The stave thus constructed, it will be seen, is very stout, and by reason of the several arches and projecting flanges is able to stand any amount of hard usage without losing its shape.

Now, in order to form a barrel from the above staves it is only necessary to set them up with the flanges 2 2 in contact with those of the next stave, and then to place the hoops on and drive them to their proper positions, after the manner of making ordinary wooden barrels.

As the flanges at the side of the staves have a broad bearing upon each other, they are effectually prevented from slipping by, and will therefore act in the same manner as ordinary wood staves. If desired, instead of having the flanges come close together, as shown, they may be bent slightly either inward or outward, as shown in Figs. 5 and 6—in the latter case to give elasticity to the barrel or to permit of applying some sealing material to the cracks thus formed, or in the former case to permit of sealing or galvanizing on the inside and permitting the galvanizing material to fill the crevice formed therein.

The manner of forming the croze and attaching the head may be varied in many ways, as may also the construction of the head. For instance, a plain metal head without flanges (such as shown in Fig. 7) might be employed, in this case the edge of the metal disk being confined between the corrugation and the ends of the flanges 1 1, the ordinary hoop being ap-

plied to the outside of the staves, pressing them inward and strengthening the chine, as shown; or, if desired, a concavo-convex head might be employed having a flange around it, as shown in Fig. 8, adapted to be confined in a manner similar to the device shown in Fig. 7, but having the projecting flange turned down.

In Fig. 9 I have shown the tops of the flanges on the staves inclined, forming the under side of the croze inclined and a wooden head applied thereto, and this device may be used in connection with a head composed partly of wood and partly of metal, $x x$, the two side pieces of metal being provided with flanges $y y$, projecting beneath the wooden piece z , as shown in Fig. 11, and they may be provided with upwardly or downwardly projecting flanges adapted to fit the croze.

In Fig. 10 I have shown a double corrugation or two ribs, $a a$, on the end of the stave, the groove between them constituting the croze, and this construction I regard as a particularly good one, because it relieves the ends of the longitudinal flanges $l l$ of all pressure upon them.

Barrels constructed as above may be used for liquids, in which event, I propose to line them with some form of cement in order to make a tight joint between the staves, or to galvanize them, so as to render them non-corrosive, and also to fill the insides of the seams with the galvanizing material; or I also propose to use them for dry substances, in which case the barrel can be formed, in the usual manner, without the use of cement or galvanizing material, the hoops being relied upon to fasten the whole together, and when thus used one of the flanges l may, if desired, be dispensed with, a tight joint being made by one flange with the plain edge of the next stave.

The barrel as a whole is much stronger and lighter than the wooden barrels ordinarily in use, and is practically indestructible. The staves individually are much stronger by reason of the bracing and arching, and, furthermore, it can be used as a "knockdown" barrel when used for dry or semi-liquid materials, the spring in the metal flanges serving to preserve a practically-tight joint between the staves. There are no seams or corrugations on the outside of the barrel, and nothing to prevent its being rolled and manipulated after the manner of ordinary barrels.

The chine may be strengthened by a band of metal extending around the inside, if desired,

as shown in Fig. 13, or by employing an end hoop with an internally-projecting flange, as in Fig. 14, and the end of the staves may, if desired, be strengthened by forming a solid rib in lieu of the corrugation $l l$ for forming the croze, as in Fig. 15.

Various modifications will at once suggest themselves to those skilled in the art, and therefore I do not desire to be confined to the exact construction herein shown.

I claim as new—

1. The herein-described barrel, consisting of the metallic staves having the corrugations at their ends and the flanges at the sides, and the hoop or hoops for securing them together, substantially as described.

2. The herein-described barrel, consisting of the metallic staves curved so as to form the bilge, having the corrugations at their ends and the flanges at the sides, and the hoops for securing them together, substantially as described.

3. The herein-described barrel-stave, constructed of sheet metal bent transversely so as to form the bilge, and having the inwardly-turned flange at the side and the corrugations or ribs at the ends, substantially as described.

4. The herein-described barrel-stave, constructed of sheet metal bent transversely so as to form the bilge, and having the inwardly-turned flanges on both sides thereof, and the corrugations or ribs at the ends, substantially as described.

5. The herein-described barrel-stave, constructed of sheet metal bent transversely so as to form the bilge, having the flanges at the sides and the corrugations at the ends forming a portion of the croze, substantially as described.

6. The herein-described barrel-stave, constructed of sheet metal, having the flanges at the sides, terminating a short distance from the ends, and the corrugations at the ends, co-operating with the ends of the flanges to form the croze, substantially as described.

7. The herein-described barrel, constructed of sheet-metal staves, bilged as shown, having the flanges at the sides, the corrugations at the ends, forming with the ends of the flanges the croze, the sheet-metal heads, and the hoops for securing the whole together, substantially as described.

CHARLES R. PENFIELD.

Witnesses:

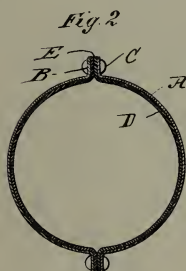
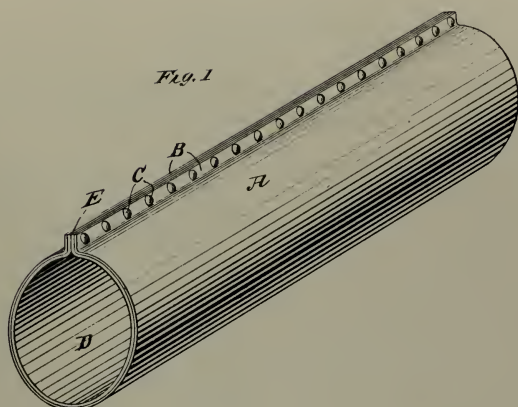
DE L. CRITTENDEN,
W. D. ARMATAGE.

(No Model.)

J. C. BAYLES.
PIPE OR TUBE.

No. 406,332.

Patented July 2, 1889.



Witnesses:

Raphael Netter
Robert F. Gaylord

Jas. C. Bayles *Inventor*
Duncan Curtis & Page *Attorneys*

UNITED STATES PATENT OFFICE.

JAMES C. BAYLES, OF NEW YORK, N. Y.

PIPE OR TUBE.

SPECIFICATION forming part of Letters Patent No. 406,332, dated July 2, 1839.

Application filed April 6, 1839. Serial No. 306,167. (No model.)

To all whom it may concern:

Be it known that I, JAMES C. BAYLES, of the city, county, and State of New York, have invented certain new and useful Improvements in Pipes or Tubes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

The present invention relates to the construction of pipes or tubes, and especially to that class of pipes that are adapted to conducting acidulous or other iron-destroying liquids. Thus in mining and similar operations it is found that much of the water that it is necessary to drain or draw off is more or less impregnated with sulphur or other elements that render it corrosive in its action upon metal pipes which usually are made of iron.

Heretofore it has been customary to a limited extent to use pipes made of wood or similarly non-corrosive material; but this kind of pipe is obviously impracticable in various respects. It is difficult to make, as well as expensive, especially in large sizes and in regions where there is little timber. It is cumbersome to handle and does not well serve where a water-tight pipe is needed.

It is therefore the object of the invention to produce a metal pipe which shall be capable of resisting the action of the iron-destroying fluids; and the invention consists of a pipe made up from sheet-iron and provided with a lining or sheathing of lead.

Referring to the drawings, Figure 1 shows a section of pipe embodying the invention and having but one seam. Figs. 2 to 5 are cross-sections of modified forms.

Referring to these views in detail, A represents the exterior or body part of the pipe. This body is composed of sheet-metal blanks, which is brought into cylindrical form by any suitable means, with outwardly-projecting flanges B along its longitudinal edges. These flanges are brought opposite each other and then secured together by the rivets C, or any other suitable form of connection—that is to say, bolts or screws may be used, or even any form of suitable clamp—and in the case of very thin metal the flanges may be made to clasp each other or lock together.

D is a lining of lead, which extends over

the entire inner surface of the metal body A. This lead lining will usually be of a thin gage, and before the seam parts of the iron body of the pipe are closed finally together the sheet of lead will be inserted in such body and worked down to conform to substantially the same form—that is, so as to lie closely on the inner surface of the sheet-iron. Of course the sheet-lead may be shaped with the body of the pipe when this is practicable, and still other ways of placing the lining within the body of the pipe and conforming it thereto will occur to those familiar with the art of pipe-making. This lead sheathing is to be flanged similarly to the blank of the body part, and the flanges E thus formed are to be brought together face to face and secured to and between the flanges B of the iron body. Thus the seam of the pipe as a whole consists of four thicknesses and forms a rib or wing extending outwardly from the surface of the pipe, which serves to stiffen and strengthen the pipe and exposes the junctional parts of the seam for easy manipulation in case of repair of leaks or ruptures.

It is essential in the construction of this pipe that the interior sheathing be secured between the flanges of the iron body. Not only is a tight seam readily formed, but the lining is held against collapsing or being forced away from the surface of the iron. Thus, as is well understood, the lead lining under the action of heat will expand and stretch, but it will not when subsequently cooled contract and return to its previous form, and the effects of long-continued expansion and contraction of the iron body of the pipe will tend to corrugate the lining and to force it away from contact with the inner face of the pipe, as well as to rupture it or cause it to collapse; but when the lining is attached to the body of the pipe the distortion of the lead lining is practically obviated, for the lining will be held against moving away from the iron. Where pipe of but a single seam is used, the pipe should be laid with the seam uppermost, so that the lining will be positively held up by the iron body, and not one by virtue of the strength of its own arch, for then the action of contraction and expansion, which would be most exerted in the arch, will have no serious or detrimental effect.

Fig. 2 shows a form of pipe having two seams, but in other respects it is the same as the pipe of Fig. 1. Fig. 3 is another similar form of pipe composed of three sections and having three seams.

It is expected that the most available form of pipe would be one having two or more seams, as the sections of such a pipe may be most conveniently bunched and shipped from the factory to the place of use, where the sections may be secured together in pipe form. So, too, with such pipe, the separate sections are so nearly flat that it is a simple matter to apply the lead linings to them, which may very readily be done at the time of assembling them into pipe form. The lead in thin sheets would have but to be laid in the sections and could be quickly shaped thereto by mallets or other simple hand-tools, and in case the run of water does not fill the pipe, or does so rarely, then only the lower or underneath section or sections need be lined.

In Fig. 4 I show the seams provided with re-enforce pieces F, which are angle-bars lying in the angles of the seams, and are employed where a strong pipe is needed and the rigidity and strength of the seam parts is a matter of importance. These re-enforce bars may be of any other suitable form, or they may be of a single piece instead of separate strips located upon opposite sides of the seam and adapted to inclose the seam parts.

Fig. 5 shows one form of flat-sided pipe, this particular form being square and having a seam along the middle line of its two opposite sides.

The invention may be embodied in yet other forms of pipe; but it is believed those shown serve to illustrate the principle of the invention and its application.

Although I have described this pipe as applied to the drainage of mines and similar works, it will be obvious that its utility is not limited thereto, and that it is applicable to the conduction of any kind of liquids and under any circumstances where such pipe would be effective.

What I claim as new is—

1. A pipe composed of a sheet-iron section shaped into cylindrical form with outwardly-projecting flanges along its opposite longitudinal edges, and a sheet-lead section similarly shaped and arranged within the sheet-iron section, with its flanges brought together face to face and secured to and between the flanges of the iron section.

2. A pipe composed of two or more sheet-iron sections, each shaped into the partial form of the pipe, with outwardly-projecting flanges at their longitudinal edges and provided with a sheet-lead lining, the sections being arranged in pipe form and their flanges secured together.

3. A pipe composed of sections of sheet-iron shaped longitudinally into pipe form and secured together along their longitudinal edges, and having a sheet-lead lining which is secured to the iron sections at their seams.

JAMES C. BAYLES.

Witnesses:

FRANK E. HARTLEY,
ERNEST HOPKINSON.

C. L. HART.
SHEET METAL PIPE.

No. 409,196.

Patented Aug. 20, 1889.



Fig. 1.

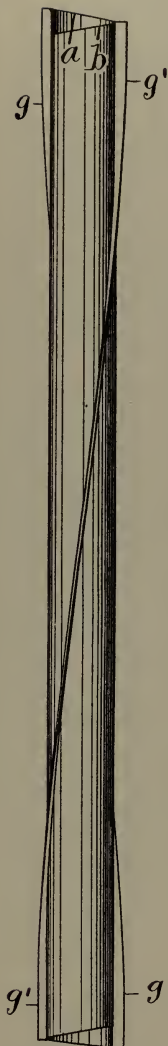


Fig. 2.

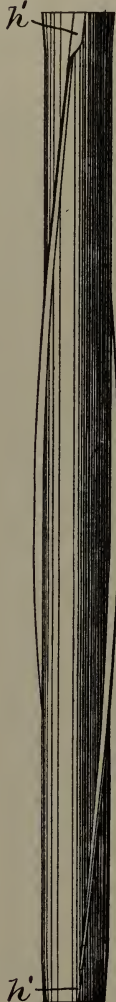


Fig. 3

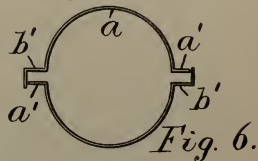


Fig. 6.

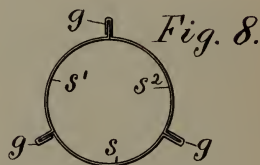


Fig. 8.

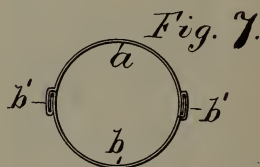


Fig. 7.

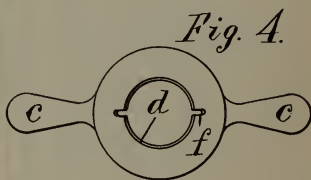


Fig. 4.

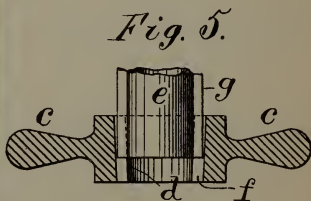


Fig. 5.

Attest:

L. Lee.
F. C. Fischer.

Inventor.

Charles L. Hart, per
Crane & Miller, attys.

UNITED STATES PATENT OFFICE.

CHARLES L. HART, OF BROOKLYN, NEW YORK.

SHEET-METAL PIPE.

SPECIFICATION forming part of Letters Patent No. 409,196, dated August 20, 1889.

Application filed December 19, 1888. Serial No. 294,134. (No model.)

To all whom it may concern:

Be it known that I, CHARLES L. HART, a citizen of the United States, residing at Brooklyn, Kings county, New York, have invented certain new and useful Improvements in Sheet-Metal Pipes, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention consists in a sheet-metal pipe formed in two or more longitudinal sections united by longitudinal twisted seams.

It also consists in certain modifications hereinafter fully set forth. When formed with standing spiral seams, the appearance of the pipe is not only novel and ornamental, but the standing spiral seams operate to brace and stiffen the pipe in a very remarkable degree.

In all the pipes heretofore manufactured with spiral seams the pipe has been constructed with a single spiral seam and formed by wrapping a blank transversely to the axis of the pipe and securing one edge of the blank upon the opposite edge of the same blank when lapped spirally thereon. Such a process may be continued indefinitely to form an endless pipe; but to form a pipe in such manner requires special machinery adapted to wind the blank and secure its overlapped edges together, and the object of my present invention is to avoid the expense of such special machinery in forming a pipe with a spiral seam. I effect such object by first forming the pipe of straight longitudinal sections of convenient length united by longitudinal seams and then twisting the whole when seamed together.

The straight longitudinal sections which are required to form a pipe with straight longitudinal seams may be readily shaped without expensive dies in the ordinary cornice-brake found in the shops of all large workers in sheet metal, and they may also be formed in suitable stamping or shaping presses by providing dies of suitable profile and pressing the sheet-metal blanks between them. The pipe may thus be made and seamed longitudinally with very little expense, and may then be twisted bodily to form the twisted seam thereon by merely grasping the two ends of the pipe and turning them in opposite directions.

The invention will be fully understood by reference to the annexed drawings, in which— 55

Figure 1 is a view of a pipe provided with straight longitudinal seams prior to the twisting operation, the view showing the edge of the standing seam *g*. Fig. 2 is a side view of the same pipe with standing seam *g* spirally twisted one-half a revolution in the length of the pipe. Fig. 3 is an edge view of the same pipe with one end of the pipe tapered and a portion of the standing seam removed and the other end flared and the standing seam flattened down. Fig. 4 is an end view of a die adapted to twist such pipe. Fig. 5 is a longitudinal section across the center of the same with one end *e* of the pipe fitted therein. Fig. 6 is an end view of the two sections of a pipe shaped ready for seaming. Fig. 7 is an end view of the same pipe with the seam closed and bent down upon the pipe, and Fig. 8 is an end view of a pipe formed in three longitudinal sections with three standing seams. Figs. 6, 7, and 8 are drawn upon a larger scale than the other figures. 60 65 70 75

In Fig. 6 the sections of the pipe are shaped each to embrace one-half its circumference, the sections *a* and *b* being provided each with a longitudinal radial flange *a'* at one edge and with a bent flange *b'* at the opposite edge. The sections are thus similar, and any number of similar sections may thus be used in forming the pipe. 80 85

Fig. 7 shows the sections united together with the flange *b'* closed over the flange *a* and both bent down over the pipe, as in double seaming.

In Fig. 8 the pipe is shown formed in three longitudinal sections *s*, *s'*, and *s''*, united by similar seams, but the seams *g* projecting radially from the pipe. 90

In Figs. 4 and 5 the die is shown provided with handles *c* and formed with a conical bore *d*, adapted to partially admit the end of the pipe *e*. Longitudinal grooves *f* are formed in the sides of the bore to admit the standing seams *g*. The pipe is made in the following manner: 95 100

Sheet-metal section-blanks of suitable length and width are prepared to form the required sections for one length of pipe, and each is shaped at its edges to form a seam in conjunction with the edges of the adjacent sections. The longitudinal seams are then 105

closed sufficiently to hold the sections together during the twisting operation, and the seams are, after the pipe is twisted, permanently closed to hold the sections in their twisted position.

It will be readily perceived by comparing Figs. 1 and 2 that the spiral seam in Fig. 2 is necessarily longer upon the same pipe than the straight seam in Fig. 1, and it will therefore be obvious that in the twisting operation one or more of the flanges a' must slide longitudinally upon certain of the flanges b' an amount corresponding to the difference in the length of the straight and spiral seams, and that the end of each section will assume an angle with the axis of the pipe, owing to the twisting of each section-blank around such axis. All the seams are not therefore rigidly closed prior to the twisting operation, as such closing would cause a great resistance to such sliding movement of the flanges, but part only of the seams, as the seam g' in Fig. 2, are closed rigidly before the pipe is twisted to hold the sections firmly in their twisted position.

It will be noticed in Fig. 2 that the ends of the blanks a and b coincide upon the closed seam g' , thus forcing the sliding of the flanges to occur upon the seam g , at the ends of which the displacement is obvious. It will also be understood that the metal in the flanges a' and b' is materially changed in form during the twisting operation, and receives a permanent set to such form before and during the final closing of the seams. It is well known that longitudinal blanks bent in the form shown in Fig. 6 are in practice, when formed, more or less warped or buckled, so that the flanges a' and b' upon the opposite edges of the section a or b would not lie in the same flat plane. The seaming of the sections together brings the flanges a' and b' into contact without materially affecting the tendency of the sections to warp or buckle, and a perfectly straight pipe is not therefore produced by the mere joining of the seams. I have, however, discovered that the twisting operation serves to remove all the buckle from the pipe and to make it exceedingly straight, while the "set" imparted to the respective sections and the seams formed upon their edges serve to hold the pipe permanently in such straight condition. By retaining the seams in a radial position upon the finished pipe at the close of the final seaming operation, as shown in Figs. 2, 3, and 8, the standing seam greatly re-enforces the pipe in every direction and imparts to it an unusual degree of strength and rigidity.

It will be understood by reference to Fig. 1 that the edges of the sections a and b in the untwisted pipe are parallel with the axis of the cylinder or pipe which they form, the curvature of the metal being transverse at the edges to such axis, while an inspection of Fig. 3 will show that the twisting operation entirely changes the cylindrical curva-

ture of the metal, so that the line of the curvature is not parallel with the edges of the sections, but at an angle thereto equal to the arc through which the pipe is twisted.

The spiral seam formed upon the pipe in my invention is a much longer and more gradual spiral than could be formed by spirally winding a single blank and securing its overlapped edges, and my construction is readily distinguished from any pipe having a single spiral seam instead of two or more, as in my invention.

The blanks for the sections may be formed with oblique ends, so that when the pipe is twisted its ends will be at right angles to its axis. When the standing seam is used, the pipe-lengths may be readily fitted together by flattening down or removing a portion of the seam at each end and fitting the ends to enter one into the other, as is common with sheet-metal pipes, and shown upon the pipe in Fig. 3 at h and h' .

It is immaterial how the pipes are twisted after seaming or how the seams are finally locked to hold the sections in their twisted position, and no means for locking the seams is therefore shown herein.

Having thus set forth my invention, what I claim is—

1. As a new article of manufacture, a sheet-metal pipe formed in two or more longitudinal sections and having twisted seams at the joints of the sections, substantially as herein set forth.

2. As a new article of manufacture, sheet-metal pipes in uniform lengths formed in two or more longitudinal sections and having twisted seams at the joints of the sections, substantially as herein set forth.

3. As a new article of manufacture, a sheet-metal pipe formed in two or more longitudinal sections and having twisted standing seams at the joints of the sections, substantially as herein set forth.

4. As a new article of manufacture, a sheet-metal pipe formed in two or more longitudinal sections and having twisted standing seams at the joints of the sections, with the projection of the seam removed at the ends of the pipe and the ends longitudinally flared and tapered to join the same in series, substantially as herein set forth.

5. As a new article of manufacture, a sheet-metal pipe formed in two or more longitudinal sections united by longitudinal standing seams and having the sections and seams twisted and held in a twisted condition by the locking of the seams, as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CHARLES L. HART.

Witnesses:

ANSON O. KITREDGE,
HENRY COLWELL.

(No Model.)

J. C. BAYLES.
PIPE SECTION.

No. 427,658.

Patented May 13, 1890.

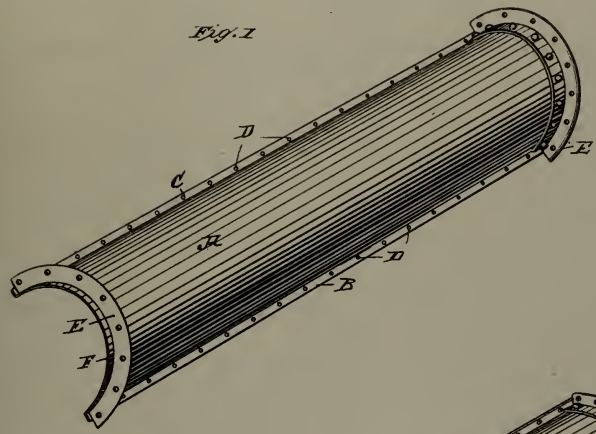


Fig. 1

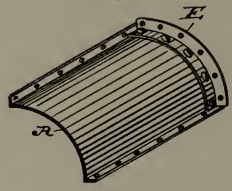


Fig. 2

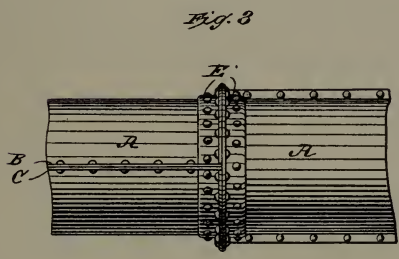


Fig. 3

Witnesses:

Robert F. Gaylord
Ernest Hopkinson

Inventor

James C. Bayles

By

Duncan Curtis Page
Attorneys.

UNITED STATES PATENT OFFICE.

JAMES C. BAYLES, OF NEW YORK, N. Y.

PIPE-SECTION.

SPECIFICATION forming part of Letters Patent No. 427,658, dated May 13, 1890.

Application filed July 13, 1889. Serial No. 317,458. (No model.)

To all whom it may concern:

Be it known that I, JAMES C. BAYLES, of the city, county, and State of New York, have invented certain new and useful Improvements in Pipe-Sections, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

The present invention relates, generally, to longitudinally-seamed pipes, but particularly does it relate to the construction of the separate parts or sections thereof—that is, it is the object of the invention to construct the sections of the pipe so that they will all be duplicates or interchangeable, as also so that they will be adapted to be put together at the place of employment without the use of special tools and without the necessity for the sections being further shaped or otherwise constructively worked upon.

The invention consists of a pipe-section shaped to the circle of the pipe or forming a segmental part thereof, having outwardly bent and punched flanges along its opposite longitudinal edges and provided at each of its ends with a segmental coupling part adapting it to be bolted to the ends of similar sections.

In the drawings, Figure 1 is a perspective view of a half-circle pipe-section embodying the invention. Fig. 2 is like view of a part of a quarter-circle section. Fig. 3 is a plan view of a pipe composed of half-circle sections, showing how the sections are joined together.

Referring to these views in detail, A represents the blank or body part of the section. This is composed of any suitable sheet or plate metal. It is rolled or otherwise curved into a semicircular form corresponding to the shape of the pipe, and the longitudinal outwardly-projecting flanges B and C are formed along its longitudinal edges, and these flanges are punched to form the bolt or rivet holes D. E are the segmental coupling heads or connections. These are composed of angle-iron bent to the proper curve and riveted to the ends of the blank A by the rivets E. Preferably one end of the blank projects slightly beyond its coupling-head, as seen at F, to

form a support or guide for the end of the section to be attached thereto.

Fig. 2 illustrates a section forming but a one-fourth part of the pipe. This section is constructed similarly to that of Fig. 1. Obviously the pipe may be composed of any number of sections more than two, and such sections may be made in the form of pipe of a cross-sectional shape other than that shown.

In Fig. 3 sections of the construction shown in Fig. 1 are shown bolted or riveted together into the form of a pipe, the seams being offset, so that the coupling parts break joints and serve to hold one another firmly in place circularly as well as longitudinally.

The special advantage connected with pipe-sections thus made is that they may be readily nested or secured together in compact bundles of sizes convenient for handling, which permit packing the sections into a very much smaller space than would be occupied by the finished pipe made therefrom. This effects great saving in the cost of transportation and makes it possible to ship pipe economically over long distances.

The sections are readily assembled and riveted and bolted together, and no special skill is required therefor, nor is a special assembling plant or special tools or machinery therefor demanded at the place where the pipe is to be formed and laid.

I am aware that pipe has been made of two or more longitudinal sections outwardly flanged and adapted to be riveted together, as also that various forms of coupling parts have been attached to such pipe, and I do not claim such a structure.

My invention embodies a pipe-section flanged and punched for riveting to other like sections, and provided with a segmental coupling part at each end forming only the corresponding part of the whole coupling that the longitudinal section does of the pipe, whereby the sections of a pipe are all alike and interchangeable.

What is claimed as new is—

1. As a new article of manufacture, the herein-described longitudinal segmental pipe-section, consisting of a blank shaped to the form of a pipe, and having outwardly-bent

punched flanges along its longitudinal edges and provided with segmental coupling parts riveted to the ends thereof, and adapted to be bolted to the coupling parts of a similar section, substantially as set forth.

5 2. In a pipe or tube section, the combination of two or more longitudinal segmental sections having outwardly-bent flanges along their longitudinal edges, and segmental coupling

parts secured to the ends of each of said segmental sections, whereby the several sections of a completed pipe are duplicates and interchangeable, as set forth.

JAMES C. BAYLES.

Witnesses:

ROBT. F. GAYLORD,
ERNEST HOPKINSON.

A. GERSDORFF.
FUNNEL.

No. 453,798.

Patented June 9, 1891.

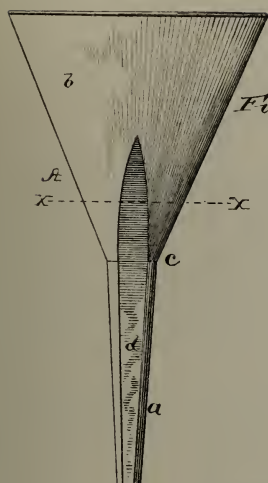


Fig. I.



Fig. II.

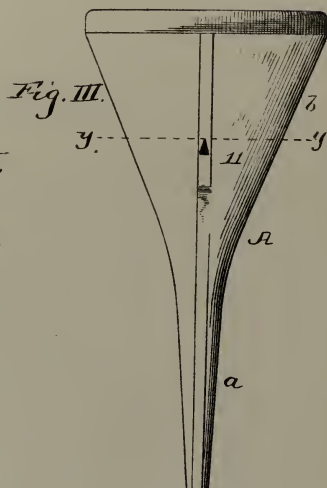


Fig. III.

Fig. IV.

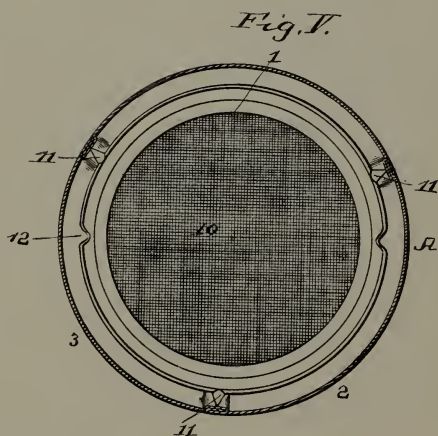
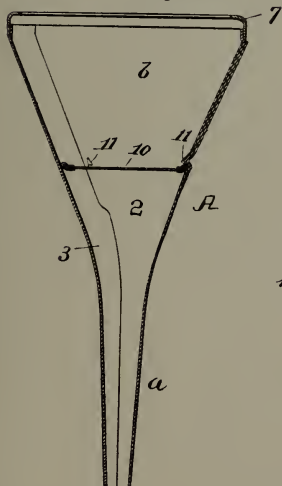


Fig. V.

Witnesses:
J. B. McGinnis
Wm. A. Belt

Inventor:
Augustus Gersdorff
By Edwin Best,
his attorney

UNITED STATES PATENT OFFICE.

AUGUSTUS GERSDORFF, OF BRIDGETON, NEW JERSEY.

FUNNEL.

SPECIFICATION forming part of Letters Patent No. 453,798, dated June 9, 1891.

Application filed June 23, 1890. Serial No. 356,435. (No model.)

To all whom it may concern:

Be it known that I, AUGUSTUS GERSDORFF, a citizen of the United States, residing at Bridgeton, in the county of Cumberland and State of New Jersey, have invented certain new and useful Improvements in Funnels; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improved funnel of that class in which vents are provided in the nozzle for the escape of air while liquids are being poured through the funnel into a vessel.

My invention consists in the combination of a funnel having seats or lugs arranged inferiorly within the body thereof and a removable strainer seated within said funnel and having a spring-flange bearing upon the interior seats or lugs, which operate to hold the strainer against displacement, all as will be hereinafter more fully described and claimed.

To enable others to more readily understand my invention, I will now proceed to a detailed description of the same in connection with the accompanying drawings, in which—

Figure I is an elevation of the funnel embodying my invention. Fig. II is a transverse sectional view through the body of the funnel above the joint between the nozzle and body on the plane indicated by the dotted line $x x$ of Fig. I. Fig. III is an elevation of my preferred form of funnel having the body and nozzle made of longitudinal sections. Fig. IV is a vertical sectional view through the funnel shown in Fig. III, and Fig. V is a transverse section on the line $y y$ of Fig. III.

Like letters and numerals of reference denote corresponding parts in all the figures of the drawings.

A designates my improved funnel, which comprises the tapered body b and the nozzle n . The body and nozzle may be made of separate pieces and connected together by the joint c in the ordinary manner; but as a better and cheaper manner of making the funnel I prefer to construct it in longitudinal sections 1 2 3, which may consist of two, three, or more, each section forming a part of the body and nozzle of the funnel.

The device constructed as shown in Figs. I and II has its round nozzle flattened on one side to form a vent d , which vent extends longitudinally of the nozzle and into the body b to a point about or above midway of the length of said body, which is advantageous, as it provides for the escape of air should the funnel be placed in a vessel having a mouth of greater diameter than the cross-sectional area of the nozzle.

The preferred form of the funnel shown in Figs. III and IV has its nozzle provided with a plurality of flat sides and forming a series of vents, and the nozzle in the cross-section preferably has the form of a triangle, as shown and described in a prior patent issued to me February 8, 1887, and numbered 357,476.

The sections 1 2 3 of the funnel extend from the top of the body to the lower end of the nozzle, each section forming a part of the body and nozzle. The parts of the section which form the body of the nozzle are each made segmental in cross-section, and the lower parts of said section that form part of the nozzle are flattened. The sections are united together along their side edges through the body of the funnel by bending the same to form flanges and interlocking and soldering the flanges together, thus forming longitudinal seams; but in the nozzle the sections are united by soldering, instead of interlocking the flanges, thus forming continuous smooth seams. The segmental portions of the sections form the body, which is circular in cross-section, and the flattened lower portions of said sections form the triangular nozzle, as shown. The upper end of the funnel is finished and the ends of the joints between the side sections 1 2 3 concealed by an annulus or ring 7, which is bent or curved to extend inward a short distance.

In connection with my improved funnel I employ a strainer 10, which is adapted to be fitted within the body of the funnel and to be held therein by means of lugs 11, formed inferiorly within the funnel. In order to provide lugs which shall be sufficiently strong and not easily broken and without weakening the funnel, I stamp or press the lugs through the locked seams which unite the sections of the funnel, and these lugs are preferably tapered and have their lower ends made broad to pro-

vide a bearing-surface against which the screen impinges or bears. To permit the screen to be readily adjusted or fitted within the funnel below the lugs and to remove the screen when desired, I form recesses 12 (one, two, or more) in the edge of the screen by indenting or forcing the edge inwardly. The screen can be readily sprung or forced into position within the body of the funnel and below the lugs therein, which lugs operate to firmly secure the same in place; but to remove the screen from the funnel it must be turned so that one of the lugs enters one of the recesses, after which the screen will readily drop out of the funnel when it is inverted, or it can be removed by hand.

A funnel constructed as contemplated by my present invention can be readily and easily cleaned, as the absence of the joint between the body and nozzle of the funnel provides a smooth surface, which facilitates the cleaning of the funnel.

Changes in the form and proportion of parts can be made without departing from the spirit or sacrificing the advantages of my invention, and I would therefore have it understood that I reserve the right to make such modifications as fall within the scope of my invention.

No claim is herein made to the funnel made of longitudinal sections, each section forming a part of the body and nozzle of the funnel and extending from the point of the nozzle to the top of the body, the sections being joined together by longitudinal seams, nor to the nozzle formed with the flattened side or sides, as these features form the subject-matter of a separate application filed by me on the 19th day of March, 1888, Serial No. 267,645.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In combination with the funnel having within the interior of its body the inwardly-projecting lugs, a strainer having a spring-flange, which is adapted to pass downward over and be locked in place by said lugs, substantially as described.

2. In combination with the funnel provided with the inwardly-projecting locking-lugs, and the strainer having a spring-flange, which is thus adapted to pass downward over and to be locked in place by said lugs, and is provided within its edge with notches that when caused to coincide with said lugs will operate to release said strainer and permit of its removal, substantially as herein shown and described.

3. The combination of a funnel provided with the retaining-lugs, which are arranged interiorly within the body of the same, and which lugs are stamped or pressed from the seams which unite the sections of the funnel together, and a strainer provided with a spring-flange, which is adapted to pass downward over and be locked in place by the said lugs, substantially as and for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

AUGUSTUS GERSDORFF.

Witnesses:

JAMES J. REEVES,

HUGH L. REEVES.

A. GERSDORFF. FUNNEL.

No. 491,421.

Patented Feb. 7, 1893.

Fig. 1.

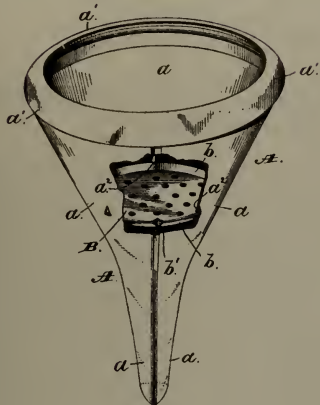


Fig. 2.

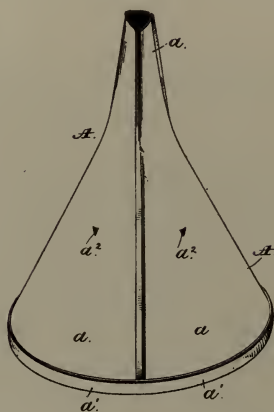


Fig. 4.

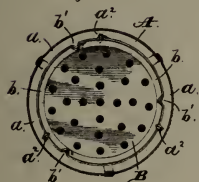


Fig. 3.



Fig. 5.

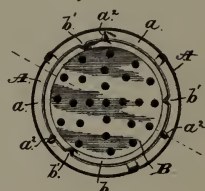
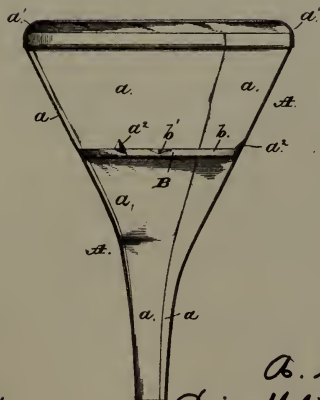


Fig. 6.



Witnesses:
Jesse Hutchinson.
Harry C. Hazard.

Inventor.
A. Gersdorff, by
Charles W. Russell, his Attys

UNITED STATES PATENT OFFICE.

AUGUSTUS GERSDORFF, OF WASHINGTON, DISTRICT OF COLUMBIA.

FUNNEL.

SPECIFICATION forming part of Letters Patent No. 491,421, dated February 7, 1893.

Application filed March 19, 1888. Serial No. 267,645. (No model.)

To all whom it may concern:

Be it known that I, AUGUSTUS GERSDORFF, of Washington, in the District of Columbia, have invented certain new and useful Improvements in Funnels; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of my improved funnel, from the upper end, a portion of the side being broken away to show the strainer; Fig. 2 is a like view of the same from the lower end. Fig. 3 is a perspective view of the strainer separated from the funnel. Fig. 4 is a horizontal section of the funnel at the point where the strainer is located and shows the latter in position for engagement with the locking lugs; Fig. 5 is a like view of the same after said strainer is so engaged, and, Fig. 6 is a central longitudinal section of the funnel.

Letters of like name and kind refer to like parts in each of the figures.

My invention is an improvement upon a funnel for which Letters Patent No. 357,476 were issued to me upon the 8th day of February, 1887, and it consists, principally, in the construction of the funnel, substantially as and for the purpose hereinafter specified.

In the construction of funnels it has heretofore been customary to form the body and nozzle separately and then join them together, but such construction has proved defective in consequence of the frequent separation of said parts.

My funnel A is formed from two or more—preferably three—sections *a* and *a'* which are united upon longitudinal lines so that each section extends from the upper end to the lower end of the funnel and constitutes a part of the body and a part of the nozzle of the same, as shown. The joints or seams are all lengthwise of the funnel, and in the direction of the greatest strain—transversely—said funnel presents only solid metal which is strengthened by its curved form and by said seams, and is capable of resisting successfully a much greater force than would ever be exerted by any proper use.

In the practical use of funnels, it frequently happens that the funnel is placed in a vessel having a mouth of larger diameter than the

cross sectional area of the nozzle of the funnel, so that the nozzle depends wholly within the mouth of the vessel and the lower portion of the body of the funnel rests upon the vessel, in which event the funnel prevents the free escape of air displaced in the vessel by pouring a liquid therein.

One of the aims of my present invention is to improve the funnel to avoid the foregoing objection, which is accomplished by providing the nozzle with one or more flattened longitudinal faces to form the vent or vents, and extending the vent or vents into the body of the funnel for a suitable distance and above the joint or line between the body and nozzle of the funnel, whereby air can freely escape through the vent on the outside of the funnel if it is placed on a vessel so that its body is in contact with the mouth of said vessel.

As hereinbefore stated, the funnel is made wholly of longitudinal sections which extend from the top of the body of the funnel to the lower end of the nozzle. The parts of the sections which form the body of the funnel are each made segmental in cross section, and the lower parts of said sections which form the nozzle are flattened. The sections are united together along their side edges through the body of the funnel by bending the same to form flanges and by interlocking and soldering the flanges together, thus forming the longitudinal seams; but in the nozzle, the sections are united by soldering instead of interlocking the flanges, thus forming smooth seams in the nozzle. The segmental portions at the upper ends of the sections form the body of the funnel which body is circular in cross section; and the flattened lower portions of said sections form the nozzle which is triangular in cross section, as shown in the drawings.

A funnel constructed as contemplated by my invention can be readily and easily cleaned, as the absence of the joint between the body and nozzle of the funnel provides a smooth surface on the interior of the funnel, which facilitates the cleaning of the funnel.

The upper end of the funnel has an upward and inward curve and is formed by means of a solid ring *a'* of sheet metal which is given the necessary shape by dies and has such size as to enable its lower edge to pass over and

engage with the upper edges of the sections a and a , where it is secured in place by solder and operates to thoroughly strengthen said parts and prevent their separation at such point.

Within the body of the funnel is a strainer B which is constructed from sheet metal and its central portion perforated, and around its edge is provided with a flange b that extends upward and outward at substantially the same angle as the adjacent sides of the funnel. Said strainer bears fairly upon the converging sides of said funnel and is thereby prevented from passing below a certain point and is locked in such position by means of two or more lugs a^2 and a^2 which project inward from the sides of the funnel and engage with the upper edge of the flange b . The lugs a^2 and a^2 have downwardly and inwardly inclining faces and the strainer B is placed in position by inserting one edge beneath the lug or lugs at one side of the funnel and then pressing the opposite side of said strainer downward until its flange has sprung inward sufficiently to enable it to pass the lug or lugs at such point.

In order that the strainer may be removed from the funnel, when desired, its flange b is provided with notches b' and b' which correspond in size and number to the like features of the lugs a^2 and a^2 , and have such relative arrangement that by a partial rotation of said strainer, said notches may be caused to coincide with said lugs and thus release said strainer. The same result will be secured however, if but one notch is provided, as by causing such notch to coincide with one of the lugs, the side of the strainer in which said notch is located will be released and can be raised so as to withdraw the opposite side from engagement with its locking lugs.

No claim is herein made to the combination of the funnel having the lugs arranged interiorly within the body thereof, and the strainer provided with the spring flange which is thus adapted to pass downward beneath the lugs and to be held or locked in place by the same, as said devices form the subject matter of a separate application filed by me on the 23d day of June, 1890, Serial No. 356,435.

Having thus described my invention what I claim is—

1. As a new article of manufacture, a funnel made of longitudinal sections united together by longitudinal seams and each section forming a part of the body and nozzle of the funnel, the nozzle having flattened sides which form air vents that extend longitudinally of the nozzle, into the body, and above the line where said nozzle joins the body, substantially as described.

2. As a new article of manufacture, a funnel made of longitudinal sections united together by longitudinal seams and each section forming a part of the body and nozzle of the funnel, the nozzle having flattened sides which form air vents that extend longitudinally of the nozzle, into the body, above the line where the nozzle joins the body, the seams of the body being formed by interlocking and soldering flanges and the seams in the nozzle being soldered together, whereby the inner surface of the body and nozzle is made smooth, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand this 17th day of March, 1888.

AUGUSTUS GERSDORFF.

Witnesses:

JAS. E. HUTCHINSON,
GEO. S. PRINDLE.

(No Model.)

4 Sheets—Sheet 1.

E. BERLINER.
GRAMOPHONE.

No. 534,543.

Patented Feb. 19, 1895.

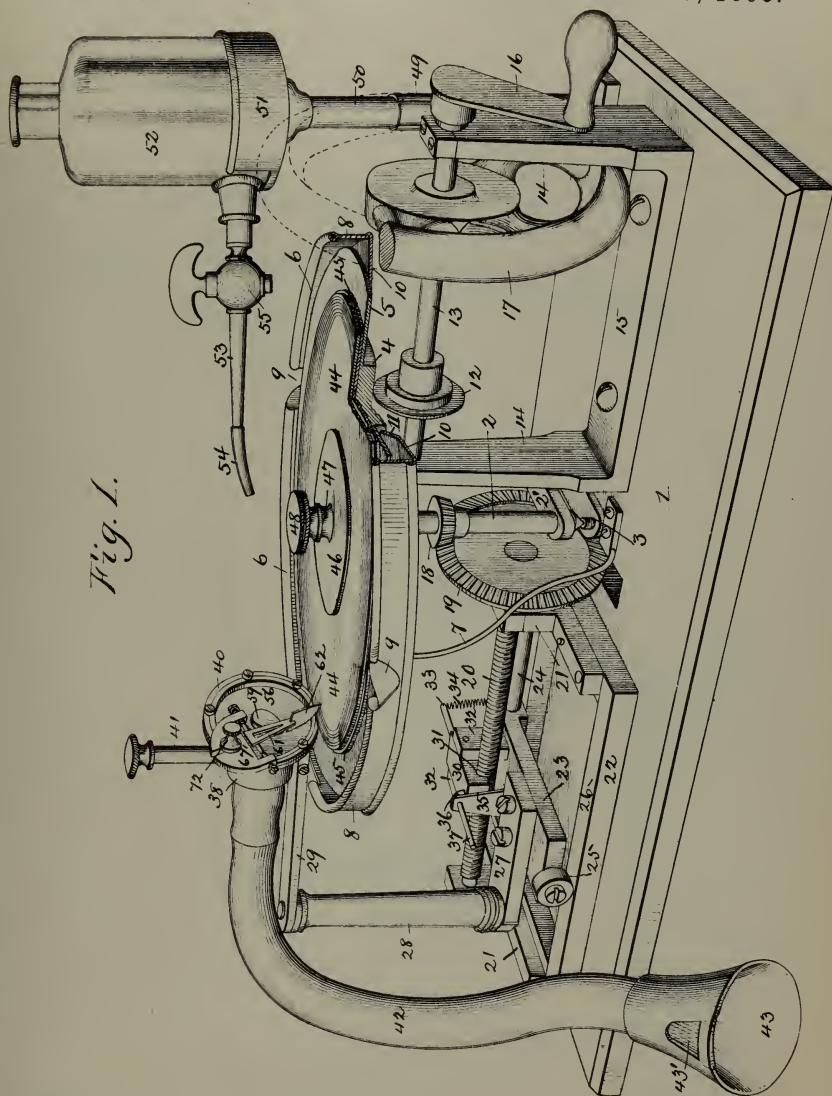


Fig. 1.

Witnesses;

Rory C. Brown,

F. T. Chapman,

Inventor;

Emile Berliner,

By Joseph Lyons,
Attorney.

(No Model.)

4 Sheets—Sheet 2.

E. BERLINER.
GRAMOPHONE.

No. 534,543.

Patented Feb. 19, 1895.

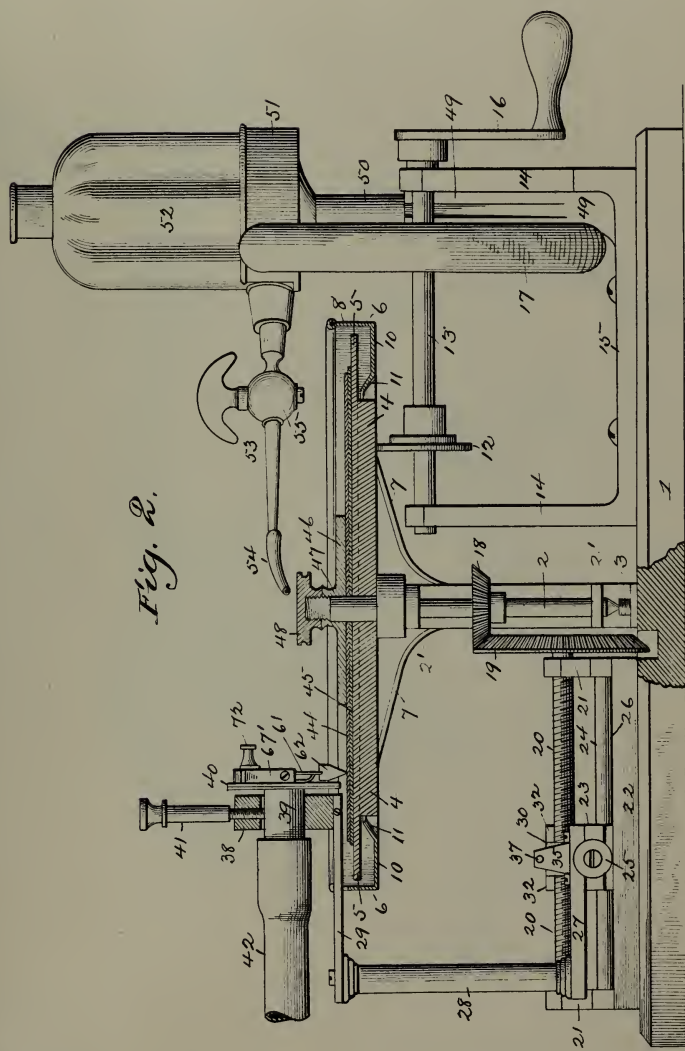


Fig. 2.

Witnesses:

J. M. Givv.
F. T. ChapmanInventor,
Emile Berliner,
By Joseph Givv.
Attorney

(No Model.)

4 Sheets—Sheet 3.

E. BERLINER.
GRAMOPHONE.

No. 534,543.

Patented Feb. 19, 1895.

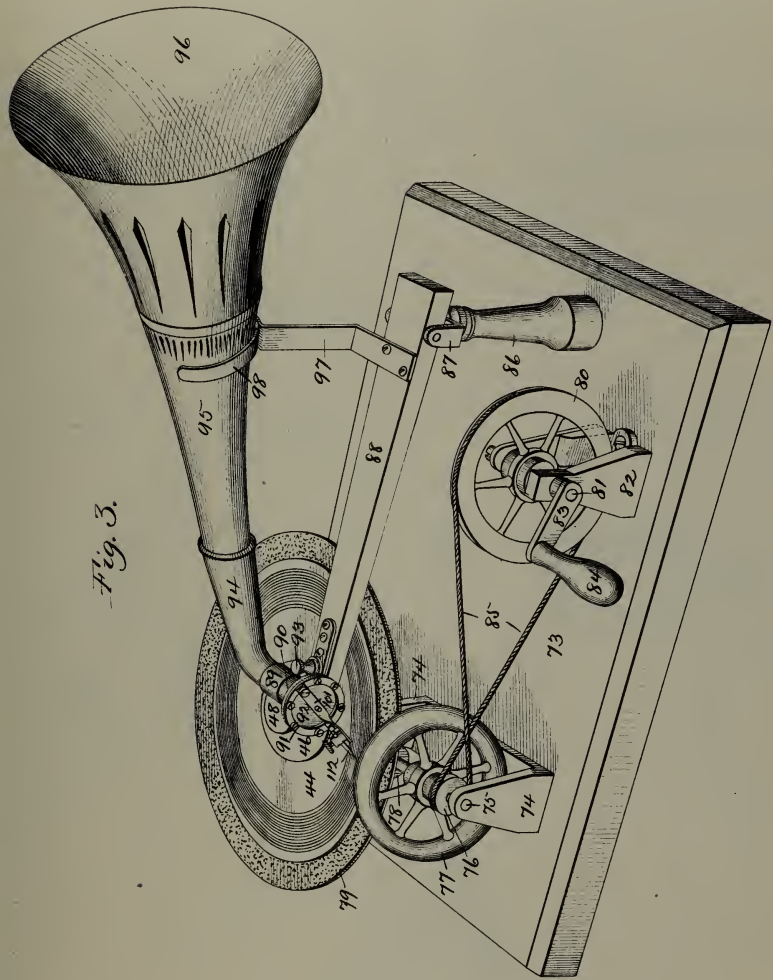


Fig. 3.

Witnesses;

Reed C. Bowen.
H. T. Chapman.

Inventor;

Emile Berliner,

By Joseph Lyons.
Attorney.

E. BERLINER.
GRAMOPHONE.

No. 534,543.

Patented Feb. 19, 1895.

Fig. 4.

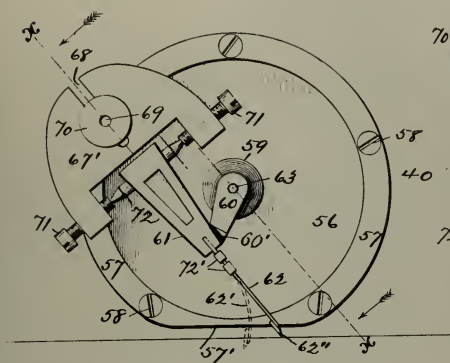


Fig. 5.

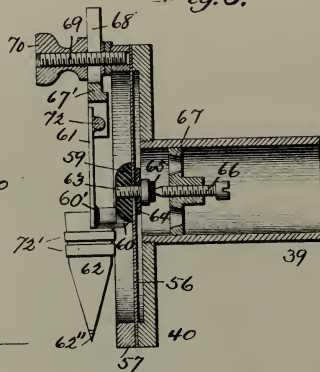


Fig. 6.

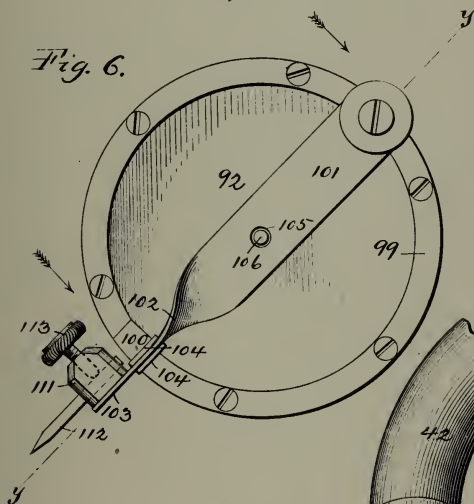


Fig. 7.

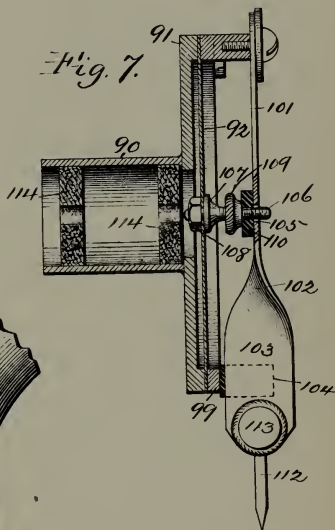
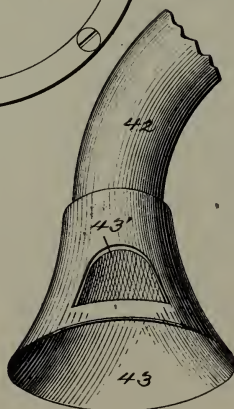


Fig. 8.



Witnesses;

Percy C. Bowen.
F. T. Chapman

Inventor;

Emile Berliner,

By Joseph Lyons.
Attorney.

UNITED STATES PATENT OFFICE.

265

EMILE BERLINER, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR
TO THE UNITED STATES GRAMOPHONE COMPANY, OF SAME PLACE.

GRAMOPHONE.

SPECIFICATION forming part of Letters Patent No. 534,543, dated February 19, 1895.

Application filed March 30, 1892. Serial No. 427,060. (No model.)

To all whom it may concern:

Be it known that I, EMILE BERLINER, a citizen of the United States, and a resident of Washington, District of Columbia, have invented certain new and useful Improvements in Gramophones, of which the following is a specification.

My invention has reference to improvements in the method of and apparatus for recording and reproducing sounds, the improvements being more particularly directed to the construction of that kind of sound recording and reproducing apparatus which I have called "gramophone," and for which Letters Patent of the United States No. 382,790, dated May 15, 1888, have been granted to me.

One feature of my invention has reference to improvements in the method of recording sound by tracing upon a fatty film deposited upon a metallic surface, undulatory lines, corresponding to sound waves, and then etching such lines in the metal base, or as it is now commonly called, the record tablet; while the other features of my invention have reference to the construction of the details of both the recorder and the reproducer of the gramophone. Each of these features of improvement are designed to overcome certain difficulties, and to avoid certain imperfections heretofore met with in the operation of the gramophone. These difficulties and imperfections, and the manner in which they are avoided, will be particularly pointed out in the following detailed description with reference to the accompanying drawings, in which—

Figure 1, is a perspective view of my improved gramophone recorder. Fig. 2 is a side elevation, partly in section, of the recorder. Fig. 3 is a perspective view of a gramophone reproducer. Fig. 4, is an elevation of a recording diaphragm and stylus. Fig. 5, is a section of the same on the line $x-x$ of Fig. 4. Fig. 6, is an elevation of the gramophone reproducing diaphragm and stylus. Fig. 7, is a section of the same on line $y-y$ of Fig. 6, and Fig. 8, is a perspective view of an improved mouth-piece for the recorder.

Like numerals of reference indicate like parts throughout the drawings.

My improved gramophone recorder is shown

as a whole in Figs. 1 and 2, mounted upon a suitable base 1. About midway of the length of this base there is an upright shaft 2, journaled in brackets 2', 2', stepped at its lower end in a suitable bearing 3. This shaft carries at its upper end a circular disk 4, the outer or peripheral portion of which is reduced in thickness as shown at 5, and this reduced portion extends over a ring shaped pan 6, supported by stays or brackets 7, from which it may be lifted and removed, when required. The outer edge or wall 8, of the pan is of sufficient height to project for a distance above the disk 4, and is provided with pouring lips 9, for a purpose hereinafter described. The bottom 10 of the pan extends under the reduced portion 5, of the disk 4, and its inner edge 11, is upturned close to the under side of the reduced portion of the disk, as shown.

Bearing against the under side of the disk 4, is a friction wheel 12, secured to a horizontal shaft 13, which latter is journaled in the upper ends of posts or uprights 14 constituting the ends of a frame, the base 15, of which is secured to the base 1 of the apparatus. The position of shaft 13, and the diameter of the friction wheel 12, are such, that a portion of the weight of the disk 4, and of its shaft 2, is supported by the friction wheel; whereby the bearing 3, is relieved from a portion of that weight, and whereby frictional gearing between the disk 4 and wheel 12 is insured, without requiring special adjustment. The shaft 13, carries at its outer end a crank 16, by means of which it is rotated, and between the two uprights 14, there is secured to the shaft a heavy fly or balance wheel 17. Secured to the upright shaft 2, below the disk 4, there is a beveled pinion 18, meshing with a large bevel gear 19, on one end of a horizontal screw-threaded shaft 20, which is arranged radial to the disk 4, and journaled adjacent to the said gear 19, and also at the other end, in pillow-blocks 21, supported on the end piece of a rectangular frame 22, which in turn is fast on the base 1. Mounted upon the frame 22, so as to be movable thereon in the direction of the length of the shaft 20, there is a carriage 23, supported at one end by a guide rod 24, on which it is free to slide, and at the other end by a roller 25, movable

along the upper surface 26, of one of the side pieces of the frame 22. The carriage 23, has firmly secured to it a projecting arm 27, on the outer end of which is an upright post 28, carrying at its upper end an arm 29, parallel with the arm 27, and of such length as to overhang the disk 4, when the carriage is moved to the right, as represented in the drawings; the construction being such, that when the carriage 23 is moved in the manner to be described, the arm 27, will be carried radially over the disk 4, and any object carried thereby will participate in said movement.

The carriage 23, is moved in one direction by means of the screw-threaded shaft 20, and in order to effect this operation, there is provided a block 30, in one side of which, near one end, is formed a half nut 31, constructed to engage the threads on the shaft 20; and this block 30, is pivotally supported between ears 32, erected on the carriage 23. Projecting from the other end of the block 30, there is a pin 33, to which one end of a spring 34, is attached, the other end of said spring being secured to the carriage 23, and the tendency of the spring is to maintain the block 30, in a tilted position with the nut portion raised out of engagement with the shaft 20. In order to lock the block 30, in engagement with the shaft 20 there is provided a leaf spring 35, mounted on the carriage 20, opposite the free end of the block 30, and having on its free end a tooth 36, which passes over the top of the hinged block 30, when the nut formed in the same is in engagement with the screw threads on the shaft 20, the tendency of the leaf spring 35, being to move inwardly toward the block 30. This catch spring 35, is also provided with a pin 37, which serves as a handle for withdrawing the catch so as to unlock the block 30, and thereby allow the carriage 23 with its appurtenances to be freely moved to any position upon the frame 22.

To the free overhanging arm 29, is secured a ring sleeve 38 which receives the neck 39, projecting on one side from the frame 40, in which latter the recording diaphragm and stylus are mounted, and this neck 39, with its appurtenances is fixed in any desired position in the ring frame 38, by a clamp screw 41. The free end of the neck 39, projects beyond the ring frame 38, and receives the sound conveying tube 42, which is preferably made flexible, and which has at its free end a mouth-piece 43, the particular construction of which will hereinafter be more fully described.

The disk 4, which is in the nature of a rotary table, has hereinbefore been described and is shown in the drawings as reduced in thickness on that portion of the periphery which overlaps the inner wall of the pan 6, and if this construction is used, the disk 4, must be removable from the shaft 2. It is, however, also practicable to make the disk or revolving table, in two parts, the lower part of which extending only to within a short dis-

tance of the upper edge of the inner wall of the pan, while the upper part extends to that edge to within a short distance of outer wall of the pan. This is indicated by dotted line in Fig. 2, and if this construction is adopted, only the upper thinner part of table is removable from the upright shaft while the lower thicker part of the table must be fixed to that shaft.

When a sound record is to be made, a record tablet of the kind described in my aforesaid Letters Patent, is placed upon the rotary table 4, and this record tablet is represented in the drawings as a circular disk 44, which has a central perforation passing over the upper end of the shaft 2. Sometimes it is convenient to interpose between the record tablet and the rotary supporting table a thin disk 45, of felt, or of some other non-resonant material. This, however, is not essential. Upon the record tablet is placed a clamping plate 46, which by preference is provided with a hub 47, which is slipped over the upper end of the shaft 2. This upper end of the shaft 2, is screw-threaded as shown, and a thumb nut 48, is then screwed down upon the hub of the clamping plate, whereby the record tablet is securely fastened in position.

At one end of the base plate 1, there is mounted a standard 49, which may be a split tube as shown, and in which is supported a frictional stem 50, projecting from the bottom of a shelf 51, and which in turn supports a vessel 52, containing alcohol. From the bottom of this vessel extends a tube 53, preferably provided at its free end with a flexible nozzle 54; and a stop-cock 55, with which the tube is provided permits the operator to regulate the flow of alcohol from the nozzle. With my present improvement it is necessary that during the whole process of tracing the record, the record tablet be covered with a film of alcohol, and for this purpose a thin stream of alcohol is directed upon the center of the tablet, or rather upon the clamping plate 46, from which the alcohol spreads in all directions by centrifugal force, and flows over into the pan 6. When the tracing of the record has been completed, the clamping plate is removed and the record tablet also is lifted from its support by the insertion between the same of a sharp edge, such as a knife blade, or even by the finger nails of the operator, and is removed for further manipulation as described in my aforesaid Letters Patent, and also for the manipulation which will be described hereinafter.

Only a very small quantity of alcohol is used for producing a single record, but after continued use of the machine a considerable amount of alcohol accumulates in the pan, and this is removed by removing the tablet 4, or the upper, thinner part thereof, as the case may be, by inserting a finger in each of the pouring lips 3, and thus lifting the disk or table 4, from the shaft 2. The pan is then removed from the bracket 7, and the alcohol

is poured out and preferably back into the vessel 52, by one of the pouring lips.

The recording diaphragm 56, is mounted in the circular frame 40, between a ledge formed on said frame and an annulus 57, screwed down upon the same by screws 58, as shown, or in any other suitable manner. On the rear side of that diaphragm there is applied a small block 59, of hard rubber from which extends radially an arm 60, which at its free end is turned up at right angles, outwardly and into contact with the lever 61, which carries the recording stylus 62.

The block 59, is fastened to the center of the diaphragm by a screw 63, passing through the diaphragm and through a washer 64, applied to the front side of the diaphragm. The head of this screw is faced with a disk 65, of soft rubber, and against the same bears the point of an adjusting screw 66, which is mounted in a perforated disk or spider 67, fixed in the neck 39.

The lever 61 is mounted on a plate 67', formed with a slot 68, through which a set screw 69, fixed in the annulus 57, passes. The plate 67', can thus be adjusted to various positions on the annulus, and is clamped in the adjusted position by a thumb-nut 70. One end of the plate 67' is bifurcated, and screws 71, 71, passing through the legs of the fork, are formed at their ends with bearings for the pivot points of the arbor 72, which is fixed to the lever 61. This lever, is made as light as practicable and as is consistent with rigidity, and the plate 67', together with the lever 61, which it carries, is so adjusted that the upturned end of the arm 60, bears upon the lever at the greatest practicable distance from the axis of the spindle 72, viz: at the free end of the lever. The connection between the lever and the upturned end of the arm 60 is made by a small quantity of pitch, 60', which acts as an efficient cement, and which is applied after the lever has been adjusted to its proper position. This mode of connecting the lever with the arm 60, and thereby with the diaphragm, I have found to be of great advantage for a variety of reasons, but more especially on account of the ease with which the connection is made, and unmade in case of repair, and on account of the damping effect it has upon the lever.

To the end of the lever 61, is secured the recording stylus 62, by soldering or otherwise, with its plane at right angles to the plane of the lever, as shown. The stylus is composed of a flat, and rather thin plate of spring steel, pointed at its free end, and provided with a tracing point 62'', of iridium. The broad portion of the stylus is damped by one or two bands 72', of soft rubber, which are simply slipped over the same.

By reference to Fig. 4, it will be seen that the lever 61, with the recording stylus 62 extend across the diaphragm upon a line which constitutes a chord but not a diameter of the circle of the diaphragm. They are, therefore,

eccentrically mounted with reference to the center of the diaphragm; but notwithstanding this eccentric location, the lever is rigidly connected with the center of the diaphragm and thus receives the maximum amplitude of its vibration. By thus placing the lever with the stylus eccentric with reference to the center of the diaphragm both the lever and the stylus may be and are made shorter than if they were located on the line of a diameter of the diaphragm. This is an important result, since the shorter the lever and stylus, the less liability there is of lost motion, and the less liability there is of extra or spontaneous vibrations of the lever and stylus, and both of these facts conspire to produce an accurate tracing of the sound waves impinging against the diaphragm.

Where the stylus passes over the edge of casing 40, the latter, together with the annulus 57, is cut away upon a straight line, as indicated at 57'. This permits a further reduction of the length of the stylus, since the record tablet may be located close to the straight edge 57'.

The body of the stylus is normally curved downwardly, as shown in dotted lines at 62', but when the diaphragm holder or frame 40, is turned to cause the stylus to impinge upon the record tablet, which is the preparatory step for making a record, the stylus is unbent and becomes straight, as shown in solid lines in Fig. 4, and I have found that the best results are obtained when the stylus is at an angle of about forty-five degrees with the plane of the tablet. The maximum pressure of the stylus upon the record surface is therefore equal to the force required to unbend the stylus. It is very small, because the stylus is made as thin as practicable, and it is uniform for different records and for all parts of the same record.

The mouth-piece, into which vocal sounds are uttered for recording, is shown at 43, in Figs. 1 and 8, and it consists of a bell shaped structure, the small end of which is secured to the sound conveying tube, while the wide, flaring end is turned toward the speaker who applies his mouth to the opening. Near the edge of the mouth opening there is a perforation 43', cut into the wall of the mouth-piece, and this perforation is of such shape and size, and at such distance from the edge of the mouth-piece, as to fit approximately the edge of the nose of the speaker; so that when the mouth-piece is applied, the sounds uttered by the mouth enter the wide, flaring opening, while the sounds uttered by the nose enter the perforation 43'.

In making a record of vocal sounds, it is necessary that all sound waves composing the words or the song be conveyed to the diaphragm, and it has, therefore, been proposed to make mouth-pieces of such size and shape as to admit within the opening both the mouth and the nose of the speaker or singer, and to fit against the face of the user around the

mouth and nose. Mouth pieces of this character are necessarily large and clumsy, and do not readily and comfortably fit different persons, while with my construction the size of the mouth-piece is reduced, and will comfortably fit different speakers.

By means of the apparatus so far described, a record of sound waves is made in the following manner: The spring catch 35, 36, is drawn back, which permits the spring 34, to lift the block 30, from the screw 20, so that the carriage 23, may be freely moved to the left, whereby the stylus 62, is carried beyond the edge of the rotary table 4. A record tablet prepared in the manner described in my aforesaid Letters Patent is then placed upon the table 4, and clamped to the same, as hereinbefore described, and the carriage 23, is moved toward the right until the point of the recording stylus is above the tablet but within the edge of the same. The casing 40, is then turned in its bearing 38, until the point of the stylus impinges upon the tablet and is unbent, as shown in Fig. 4. In this position the casing 40, is clamped by means of the screw 41. The stop-cock 55, is then opened and a thin stream of alcohol is directed upon the clamping disk 46. The wheel 17, is now rotated by means of the crank and handle 16, whereby, by means of the gearing described, the record tablet is rotated, while the stylus is carried across the face of the tablet in a radial line, removing from the tablet a fine spiral line of the fatty etching ground with which it had been covered. Sound waves are now directed against the diaphragm in any desired manner, and if vocal sounds are to be recorded, the sound conveying tube 42, with the mouth piece 43, will be used. The vibrations of the diaphragm thus produced will cause the stylus to make a tracing of an undulatory line, corresponding to the sound waves directed against the diaphragm; all as described in my aforesaid Letters Patent. During this whole time a thin stream of alcohol is delivered upon the plate 46, and the alcohol spreading out in all directions is maintained as a uniform and constantly renewed film upon the tablet. In this manner every part of the record is made under alcohol, and in this respect my present invention differs from the process set forth in my aforesaid Letters Patent.

In accordance with the said patent, alcohol is poured once for all over the tablet, and is allowed to evaporate during the process of recording. I have found that in this manner it often happens that the alcohol has entirely evaporated before the record is completed, so that a portion of the latter is made upon a dry tablet; whereby the accumulation of filamentary particles of dust on the point of the stylus, which the alcohol is designed to avoid, takes place during the production of a portion of the record. With my present improvement this defect is cured, since it maintains the record tablet moist with alcohol from the beginning to the end of the operation.

After the tracing of the record has been completed, the tablet is speedily removed and before the record is fixed by etching as described in my aforesaid patent, the alcohol adhering to the record surface is quickly washed off with water. This is an important step in my improved process and greatly improves the definition of the record by etching. The reason for this is, that the alcohol slightly attacks and dissolves the fatty etching ground, so that the thin film of alcohol remaining upon the tablet, contains a slight quantity of that ground in solution. If now, the film of alcohol is allowed to evaporate an exceedingly small quantity of the dissolved ground is deposited upon the metal which has been laid bare by the stylus. This small deposit of ground sufficiently resists the action of the etching fluid to impair the definition of the final record. By simply pouring water over the record surface immediately after the tablet has been removed from the recording apparatus the film of alcohol and the ground held in solution by the same is removed, and the tracings of the stylus present a clean metallic surface, which is properly attacked by the etching fluid.

The reproducing apparatus as a whole is represented in Fig. 3.

Upon a base board 73, in standards 74, is journaled a shaft 75, upon which are mounted a driven pulley 76, a fly-wheel 77, and a friction disk 78. The latter is in frictional engagement with a rotary table 79, which is mounted upon a vertical shaft substantially in the manner described with reference to the rotary table 4, of the recording apparatus. Fig. 3, being a perspective view, the mounting of the table 79, is not visible, but is easily understood from the foregoing description. The upper surface of the table is preferably covered with a sheet of felt or other elastic and non-resonant material, as indicated by appropriate shading.

Upon the felt covered table 79, the record tablet 44, is placed and is clamped thereon substantially in the manner in which this is done in the transmitting apparatus, *i. e.*, by means of a clamping plate 46, and a thumb-nut 48. A driving wheel 80, mounted on a shaft 81, which is journaled in standards 82, is rotated by means of a crank 83, and handle 84, and gives motion to the table 79, by means of a crossed belt or cord 85. The relation of the table 79, to the friction disk 78, is the same as the relation of the table 4, to the friction disk 12; that is to say, the table rests with the greater part of its weight upon the friction disk, so that the frictional gearing is automatically maintained. A post 86, mounted upon the base-board 73, has swiveled upon its upper end a fork 87, between the prongs of which is pivoted the swinging arm 88, which extends over the table 79, and has at its free end a clasp 89, which receives the neck 90, which projects from the center on one side of the casing 91, of the reproducing

diaphragm 92. This casing with its diaphragm, stylus and appurtenances, which will presently be described, can be thus turned in the clasp, and can be fixed in any adjusted position by a clamp screw 93.

Upon the end of the neck 90, which projects beyond the clasp 89, is slipped a flexible tube 94, which in turn receives the small end of a sound conveying trumpet 95, the flaring end 96 of which is turned toward the listener. A bracket 97, secured to the swinging arm 88, carries at its free end an elastic fork 98, which receives and supports the trumpet, and the parts are so proportioned that the free end of the swinging arm preponderates, so that the point of the reproducing stylus, which will presently be described, presses rather firmly upon the record tablet.

It will now be understood, that when a record tablet, having a record of sound waves upon its surface, produced in accordance with my invention, is mounted upon the table 79, and when the point of the stylus is adjusted in engagement with the record groove, and the wheel 80, is rotated, the rotating record groove will guide the stylus across the face of the tablet, and will at the same time vibrate the stylus and diaphragm in accordance with the undulations of the record groove. The sound waves thus produced by the diaphragm will issue from the flaring opening of the trumpet, and the sounds will be heard by a listener in front of the trumpet, or in its vicinity.

The reproducing diaphragm is mounted in the casing 91, in the usual manner, being held against a ledge by means of an annulus 99. On this annulus is formed a swelling or block 100, and diametrically opposite to the same the stylus carrying spring 101, is fastened to the annulus, and extends across the face of the diaphragm and beyond the edge of the annulus. This spring 101, is a leaf spring which faces with its flat side the face of the diaphragm up to a point beyond the center of the latter, and is then twisted at right angles, as indicated at 102, and crosses the annulus edgewise as shown at 103. The tendency of the part 101, of the spring is to press toward the diaphragm, whereby the edge of the part 103, is made to bear with some force upon the annulus 99; and the tendency of the part 103, is to press against the swelling or block 100. The spring is therefore elastic in two directions at right angles to each other.

In order to prevent grinding of the spring against the annulus and against the block 100, a U-shaped piece 104, of soft rubber embraces the outer portion 103, where it bears upon the annulus and against the block. This soft rubber cushion also serves as a dampener for the spring. At the point where the spring passes over the center of the diaphragm, it has a perforation 105, and a screw pin 106, secured to the center of the diaphragm by two nuts 107, 108, extends loosely through the perforation. A thumb-nut 109, also placed on the screw-pin 108, and a soft rubber washer

110 between the thumb-nut and the spring serve to regulate the tension of the latter and of the diaphragm, as will be readily understood.

On the free end of the spring 101, 103, there is secured a binding post 111, in which the stylus 112, is held by the set screw 113, and may be adjusted to project to the required distance beyond the end of the spring. This stylus is preferably made of hard steel. It has a slunder point, but the point should not be so sharp as to cut the bottom of the record groove which it engages.

In the operation of reproducing the sounds recorded on a tablet, the stylus is guided by the walls of the record groove, and not by the bottom of the same. Consequently it is not essential that the point of the stylus be in contact with the bottom of the groove. In fact it is preferably not in contact with the same, so that this point may be made rather dull.

The sounds emitted by the reproducing diaphragm are very powerful and ordinarily too loud to be received with comfort by a listener in front of the trumpet or other receiving tube. For this reason I have found it sometimes necessary, to reduce the volume of the emitted sound before it reaches the ear, and this I accomplish by one or more perforated and exchangeable diaphragms 114, placed in the neck 90. These diaphragms should be made of some non-resonant material like soft rubber, or cork, as indicated by appropriate shading.

Having now fully described my invention, I claim and desire to secure by Letters Patent—

1. The method of recording vocal and other sounds which consists in removing from a record tablet covered with a fatty film, undulatory lines of said film by, and in accordance with the sound waves and maintaining at the same time a layer of a fluid over the film, substantially as described.

2. The method of recording vocal and other sounds upon a rotating disk covered with a fatty film which consists in spreading over said film and continuously renewing over the same a layer of a fluid and at the same time removing from said tablet undulatory lines of the fatty film by and in accordance with the sound waves, substantially as described.

3. The improvement in the art of making a gramophone record which consists in immersing and maintaining the tablet and the point of the recording stylus in alcohol during the process of recording, substantially as described.

4. The improvement in the art of making and fixing a gramophone record which consists in removing from a tablet covered with a fatty film undulatory lines of said film by and in accordance with sound waves while said film is covered with a layer of alcohol; then immediately removing the alcohol with water and then subjecting the tablet to the

action of an etching fluid, substantially as described.

5. The method of reproducing sounds from a record of the same which consists in vibrating a stylus and propelling the same along the record by and in accordance with the said record, substantially as described.

6. In a gramophone, a recording stylus pressing by its own elasticity upon the record tablet at right angles to the plane of its vibratory movements and consisting of a leaf spring terminating in a point of harder material than that of the body of the stylus, substantially as described.

7. In a gramophone, the combination of a sound receiving diaphragm and an elastic recording stylus controlled by the diaphragm and adjustable with reference to a record tablet so as to press by its own elasticity upon the same at right angles to the plane of its vibratory movements, substantially as described.

8. In a gramophone a recording stylus pressing by its own elasticity upon the record tablet at right angles to its plane of vibratory movements, and consisting of a leaf spring terminating in an iridium point, substantially as described.

9. In a gramophone, a recording stylus composed of a leaf spring terminating in a tracing point in combination with one or more elastic non-sonorous dampers, substantially as described.

10. In a gramophone a recording stylus formed of a leaf spring terminating in a tracing point in combination with one or more sleeves of soft rubber upon the leaf spring for damping the same, substantially as described.

11. In a gramophone, the combination of a sound receiving diaphragm, a lever and a recording stylus carried by the same, both extending parallel but eccentrically over the diaphragm; with a connection between the center of the diaphragm and the lever, substantially as described.

12. In a gramophone, the combination of a sound receiving diaphragm a lever and a recording stylus carried by the same, both extending over the face of the diaphragm but eccentrically thereto, with a rigid connection between the center of the diaphragm and the free end of the lever, substantially as described.

13. In a gramophone, the combination of a circular sound receiving diaphragm, a lever and an elastic recording stylus both extending parallel with the diaphragm on the line of a chord, with a rigid connection between the center of the diaphragm and the free end of the lever, substantially as described.

14. In a gramophone, the combination of a sound receiving diaphragm, a lever and an elastic stylus carried by the same, both extending parallel, but eccentrically thereto; with a bracket rigidly connected with the center of the diaphragm and removably ce-

mented to the lever, substantially as described.

15. In a gramophone, the combination of a sound receiving diaphragm mounted in a suitable frame, a bracket adjustably mounted on said frame, a lever pivoted in said frame extending parallel to and eccentrically with reference to the center of the diaphragm, and an elastic recording stylus carried by the lever; with a mechanical connection between the center of the diaphragm and the free end of the lever, substantially as described.

16. In a gramophone a sound receiving diaphragm and a tube for conveying sound waves thereto in combination with a recording stylus receiving motion from the diaphragm, and a screw mounted in the sound conveying tube bearing centrally upon the diaphragm for adjusting the tension of the latter, substantially as described.

17. In a gramophone, the combination of a horizontal rotary table adapted to support a record tablet, and a vertical shaft free to move longitudinally, carrying the table; with a friction disk engaged by the under side of the table for rotating the latter, substantially as described.

18. In a gramophone the combination of a horizontal rotary table mounted upon a vertical shaft and adapted to support a record tablet; with a friction disk engaging the under side of the table and partly sustaining the weight of the table, whereby the latter is automatically maintained in frictional gear with said disk, substantially as described.

19. In a gramophone, the combination of a rotary horizontal table adapted to receive and support a flat record tablet; with a reservoir of a suitable fluid, such as alcohol, discharging upon the center of the table and tablet, and an annular pan disposed underneath the table for receiving the overflow of alcohol, substantially as described.

20. In a gramophone the combination of a horizontal rotatable table adapted to receive and support a record tablet; with a reservoir of alcohol discharging upon the center of the table and tablet, an annular pan disposed under the edge of the table for receiving the overflow of alcohol, and a friction disk bearing upon the under side of the table between the center of the same and the inner wall of the pan, substantially as described.

21. In a gramophone, the combination of a horizontal rotary table adapted to receive and support a record tablet, a recording diaphragm and stylus connected by gearing with the table to move radially over and with the stylus in operative relation to the same, substantially as described.

22. In a gramophone, the combination of a horizontal rotating table adapted to receive and sustain a flat record tablet, with a carriage movable in a line parallel to a radius of the table, a recording diaphragm and stylus carried by the carriage with the stylus in operative contact with the record tablet, and

gearing connecting the table with said carriage, substantially as described.

23. In a gramophone, a sound conveying tube provided with a mouth piece having a flaring opening for the application of the mouth of the speaker and a perforation in the side wall of the mouth piece separated from and spaced with reference to the mouth opening and shaped to correspond to the shape of the nostrils of the speaker, substantially as described.

24. In a gramophone a sound reproducing diaphragm in combination with a stylus lever extending diametrically across the same, and elastic in two directions at right angles to each other, substantially as described.

25. In a gramophone, the combination of a diaphragm and a stylus carrier composed of a leaf spring twisted at one point so as to bring the edge of one portion at right angles to the face of the other portion, whereby it is elastic in two directions, substantially as described.

26. In a gramophone the combination of a reproducing diaphragm and stylus; with a stylus carrier composed of a leaf spring extending flat-wise over the face of the diaphragm and edgewise over the edge of the diaphragm, substantially as described.

27. In a gramophone the combination of a reproducing diaphragm mounted in a suitable frame the latter being provided at one point with a boss or stop; with a double elastic stylus carrier composed of a twisted leaf-spring tending toward the diaphragm and against the boss or stop, substantially as described.

28. In a gramophone, a reproducing diaphragm and stylus in combination with an elastic stylus carrier extending over the face of the diaphragm and tending toward the same, of an adjustable connection between the diaphragm and stylus carrier and adjustable for varying the pressure between diaphragm and style carrier, substantially as described.

29. In a gramophone the combination of a reproducing diaphragm mounted in a suitable frame provided with a boss or stop; with a

double elastic stylus carrier tending toward the diaphragm and toward the stop, and elastic non-resonant dampers interposed between the style carrier and the diaphragm and between the style carrier and the frame and stop, substantially as described.

30. In a gramophone a sound reproducing diaphragm and a sound conveying tube for the same, with one or more non-resonant perforated diaphragms in the said tube for reducing the volume of sound conveyed to the ear substantially as described.

31. In a gramophone a recording stylus pivoted to move in response to the vibrations of a diaphragm and elastic in a plane at right angles to such motions, substantially as described.

32. In a gramophone, a reproducing stylus having a wedge-shaped point engaging the walls of the record groove, substantially as described.

33. In a gramophone reproducer, a stylus carried or formed by a spring fixed at one end to the diaphragm holder and freely extending across and beyond the same and operatively connected with the center of the diaphragm, substantially as described.

34. In a gramophone reproducer, a spring constituting or carrying a stylus, fixed at one end to the diaphragm holder and extending across and beyond the periphery of the same and freely pressing against the diaphragm, substantially as described.

35. In a sound reproducing apparatus consisting of a traveling tablet having a sound record formed thereon and a reproducing stylus shaped for engagement with said record and free to be vibrated and propelled by the same, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EMILE BERLINER.

Witnesses:

HENRY E. COOPER,
F. T. CHAPMAN.

No. 612,639.

Patented Oct. 18, 1898.

J. CLAYTON.
AUDIPHONE.

(Application filed Dec. 8, 1896.)

(No Model.)

Fig. 1.

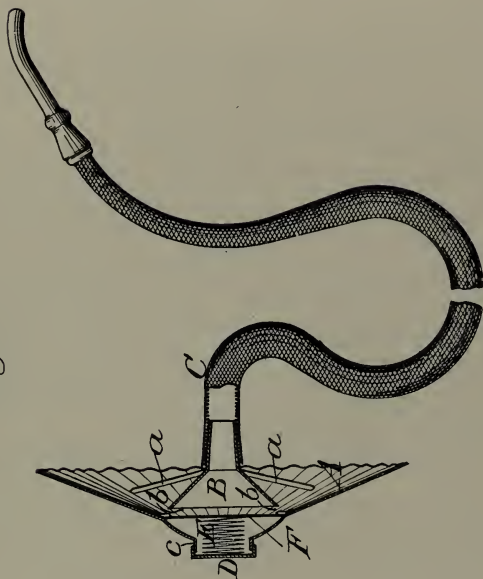
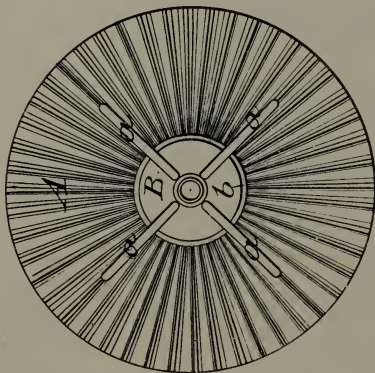


Fig. 2.



Witnesses:-
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Edward Chew.

Inventor:-
James Clayton
by attorneys
Horn & Howard

UNITED STATES PATENT OFFICE.

JAMES CLAYTON, OF NEW YORK, N. Y.

AUDIPHONE.

SPECIFICATION forming part of Letters Patent No. 612,639, dated October 18, 1898.

Application filed December 8, 1896. Serial No. 614,868. (No model.)

To all whom it may concern:

Be it known that I, JAMES CLAYTON, of the city of New York, (Brooklyn,) in the county of Kings and State of New York, have invented a new and useful Improvement in Audiphones, of which the following is a specification.

I will first describe my invention with reference to the accompanying drawings and afterward point out its novelty in the claims.

Figure 1 in the accompanying drawings represents a central sectional view of one example of an audiphone embodying my invention and provided with a flexible ear-tube. Fig. 2 is a face view of the same with the flexible ear-tube omitted.

A is a conical disk, opposite to the concave face of which is concentrically arranged the trumpet-mouth B of a sound-conducting tube C, represented as a flexible ear-tube, the said trumpet-mouth having its concavity in the opposite direction to that of the disk and being so affixed to the disk, as by radial arms *a a*, that an annular opening *b* is left between the edges of said mouth and the face of the disk. In front of the central portion of the disk opposite the trumpet-mouth there is distended a diaphragm F of suitable material, as very thin steel, the edges of the said diaphragm being united with the disk A, so that the annular opening *b*, before mentioned, is also between the diaphragm and the trumpet-mouth.

The portion of the disk A which surrounds the trumpet-mouth B is, in the example of the invention represented by the drawings, corrugated in radial lines from the diaphragm to its own circumference. The said disk has a central opening, around which is a socket *c*, and to this socket is fitted a cap D. Between this cap and the back of the diaphragm is placed a light coil-spring E, which is made to press with more or less force on the diaphragm, according as the cap is adjusted on the socket toward or from the diaphragm.

The operation is as follows: The instrument is held by the listener with the concave face of the disk A toward the speaker or

source of sound, and the end of the ear-tube is placed in his ear. The sound-waves striking the disk are gathered therein toward the center thereof and are thereby directed over the diaphragm and into the trumpet-mouth of the conducting or ear tube, the vibrations of the diaphragm greatly assisting in the sound transmission. The adjustment of the cap D and the adjustment of the pressure of the spring upon the diaphragm thereby produced give the diaphragm greater or less tension and a more or less active vibration, which can be regulated as may be found desirable by the person using the instrument. It has been found by careful and repeated experiments in the use of an instrument of this kind that as compared with a smooth conical disk the radially-corrugated disk is very much more effective.

What I claim as my invention is—

1. In an audiphone, the combination of a conical disk, a flexible diaphragm distended in front of the central portion of the concave face of and having its edges attached to said disk, and an ear-tube having a trumpet-mouth which is attached concentrically to said disk with its concavity in the opposite direction to the concavity of the disk and with an annular opening between its edges and the disk and diaphragm, substantially as herein described.

2. In an audiphone, the combination of a conical disk having a central opening, a flexible diaphragm distended in front of the concave face of and having its edges attached to said disk, an adjustable cap fitted to the central opening of the said disk behind the diaphragm, a spring located between the said cap and diaphragm for varying the tension of the diaphragm as the cap is adjusted, and an ear-tube having a trumpet-mouth attached to the said disk at the concave face thereof opposite to and spaced from the diaphragm, substantially as herein described.

JAMES CLAYTON.

Witnesses:

FREDK. HAYNES,
LIDA M. EGBERT.

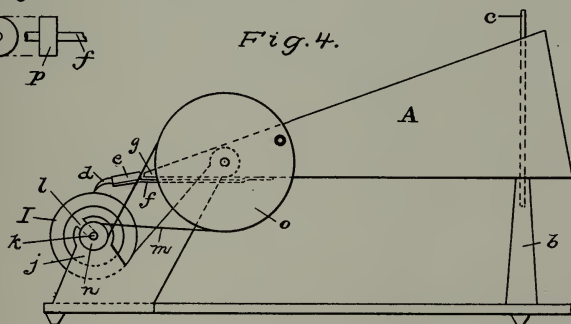
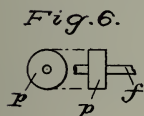
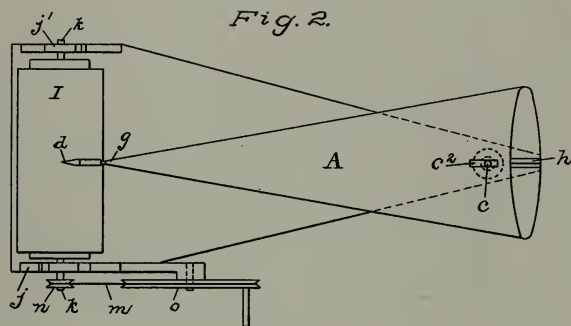
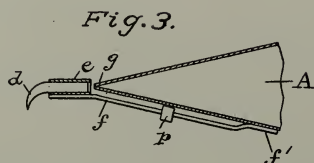
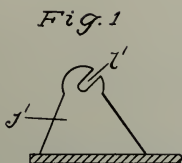
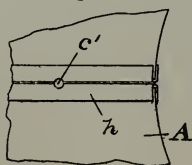
No. 632,015.

Patented Aug. 29, 1899.

G. L. HOGAN.
GRAPHOPHONE.

(Application filed Apr. 15, 1899.)

(No Model.)

*Fig. 5.*

Witnesses:

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Inventor:

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UNITED STATES PATENT OFFICE.

GEORGE L. HOGAN, OF BALTIMORE, MARYLAND.

GRAPHOPHONE.

SPECIFICATION forming part of Letters Patent No. 632,015, dated August 29, 1899.

Application filed April 15, 1899. Serial No. 713,078. (No model.)

To all whom it may concern:

Be it known that I, GEORGE L. HOGAN, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Graphophones, of which the following is a specification.

My invention relates to improvements in graphophones or devices designed for reproducing articulate speech or other sounds recorded on phonograms or sound-writings.

The object of my invention is to provide a device or mechanism of a simple, cheap, and durable construction by means of which such phonograms or sound-writings may be accurately and perfectly audibly produced without any attendant disagreeable scraping, grating, or other interfering noise resulting from the action of the mechanism.

My invention consists of a sound-generator in the form of a trumpet of conical shape made of a tough quality of paper, vulcanized fiber, or other material and having a rigidly-attached small rod of hard material, the extremity of which is brought to a fine point and bent so as to fit in the spiral grooves of the phonogram-writing and pivoting said trumpet.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a sectional view of a portion of the base on which the cylinder is mounted. Fig. 2 is a top view of the machine complete. Fig. 3 is a sectional view of the point end of the trumpet on a somewhat larger scale. Fig. 4 is a side elevation of the complete machine. Fig. 5 is a detail view of part of the trumpet, showing the manner of joining its edges. Fig. 6 is a detail view of the adjustable cushion.

The large end of the trumpet *A* rests on a stud *b*, where it is pivoted loosely on a vertical rod *c*, extending from the stud upward. This gives the point end of the trumpet a free lateral swinging movement. The trumpet has on its lower side a hole *c'* and on its upper side a slot *c''*, through which the rod passes. The longitudinal slot *c''* affords a slight range of up-and-down movement to the point end. A hard downward-curved point *d* is attached to the small end of the trumpet, and said point rests on the phonogram-cylinder, and

as the same is revolved the spiral groove of the writing serves as the means to carry the point *d* from one end to the other of the cylinder, the trumpet swinging on its pivot *c*. No other feeding or guiding device is required.

The hard point *d* may be attached to any portion of the wall of the sounding-trumpet and yield good results. I have, however, provided a novel means of attachment that will now be described. The hard point *d* is preferably held in a socket *e*, from which it may be removed when desired. The socket is fixed on the end of a rod *f* and has position in front of the point end *g* of the trumpet. This rod extends along below the small end of the trumpet, and its end *f'* is attached to the side of the trumpet some distance back from the said point end. This manner of locating the hard point *d* and connecting it with the side wall of the trumpet, but back from its point end *g*, produces the best results.

The trumpet is made of a sheet of tough paper or thin indurated fiber, and each of the two edges of this material that come together when the sheet is folded to the cone form are first bordered by a thin sheet-metal strip folded longitudinally, as shown at *h* in Fig. 5. This metal strip incloses the sheet edge like a clip and extends from the large end to the point end. The two metal strips are abutted together and joined by solder. This metal strip not only serves as a means of joining the sheet edges, but also serves to augment and improve the sounding qualities of the trumpet.

It is a feature of improvement in this invention to attach the end *f'* of the rod to which the hard point is secured to the said metal joint-strips *h*. Thereby the metal strips become the conductor for the sound vibrations, which latter are evenly distributed all along the wall of the trumpet. The pivot-hole *c'*, heretofore referred to, is through this metal strip.

The phonogram-cylinder *I* is held in position by two bearings *j j'* and a horizontal axis *k*. The bearings are slotted out instead of being bored, so that the phonogram-cylinder can easily be lifted out of these bearings. The slots *l* in the two bearings are cut at right angles to one another and are in such a position that the force of elasticity of an

india-rubber belt *m*, connecting the pulley *n*, attached to the phonogram-cylinder, with the pulley *o* of the driving device, will keep the axis of the phonogram-cylinder always pressed firmly in the bearings, and thus produce a steady movement. By this simple means I have found that articulate speech, songs, and instrumental or other music may be reproduced from sound-writing very accurately and with great loudness, clearness, and distinctness.

It will be seen that this graphophone has a cylinder that may be rotated by any driving mechanism and a sounding-trumpet whose point end is movable along the cylinder, following the sound-writing. The point end automatically follows the spiral groove of the sound-writing, and the vibrations are transmitted to the trumpet, which generates and largely increases the volume of sound.

As the hard point *d* is held in a socket, it may be removed when worn and a new one inserted.

An adjustable cushion *p* is shown in Figs. 3 and 6, as a ring, and is mounted on the rod *f* and may be shifted along said rod. This cushion bears on the wall of the trumpet, and its varying position alters the tone or pitch of the sound.

A cylinder is shown carrying the sound-writing; but it is obvious a disk may be used instead or any shaped body to rotate.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A graphophone having in combination a rotating sound-writing; a vibratory cone-shaped sounding-trumpet pivoted to allow its

point end a free swinging movement, and also a slight vertical movement; a hard point engaging the surface of the said sound-writing in front of and in line with the point end of the trumpet but not contacting therewith and supported by a rod which extends along the outer wall of the trumpet and attached to the side thereof.

2. A sounding-trumpet for graphophones comprising a sheet of fiber folded to form a cone and the edges which come together bordered by strips of metal folded over the edges and the said metal strips united, and a hard point at the point end of the trumpet.

3. A sounding-trumpet for graphophones having a cone shape and made of fiber; a strip of thin metal extending longitudinally of said cone and secured to the trumpet; a hard point in front of the trumpet's point end but not attached thereto; and a rod supporting the said hard point and extending along the outside of the trumpet and attached to said metal strip.

4. A graphophone having a base provided with two bearings each having a slot inclining in a different direction from the other; a rotary cylinder carrying the sound-writing and having journals resting in said slotted bearings; a pulley on one journal; a drive-pulley; and a belt from the drive-pulley to the cylinder-pulley; as and for the purpose set forth.

In testimony whereof I affix my signature in the presence of two witnesses.

GEORGE L. HOGAN.

Witnesses:

GEORGE KOETHER,
CHARLES B. MANN, Jr.

No. 647,147.

Patented Apr. 10, 1900.

F. MYERS.
GRAPHOPHONE.

(Application filed Dec. 15, 1899.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

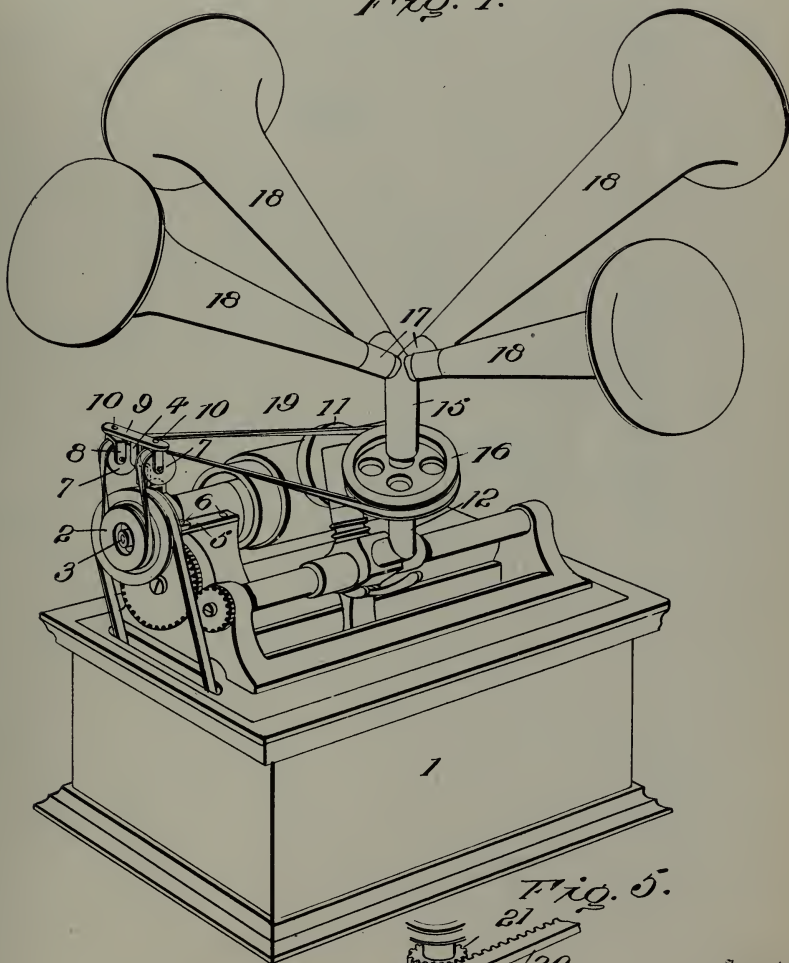
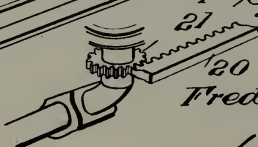


Fig. 5.



Witnesses

Jno. Imrie
F. J. Hartman

Inventor
Frederick Myers
by E. P. Barry & Co.,
his Attorney

No. 647,147.

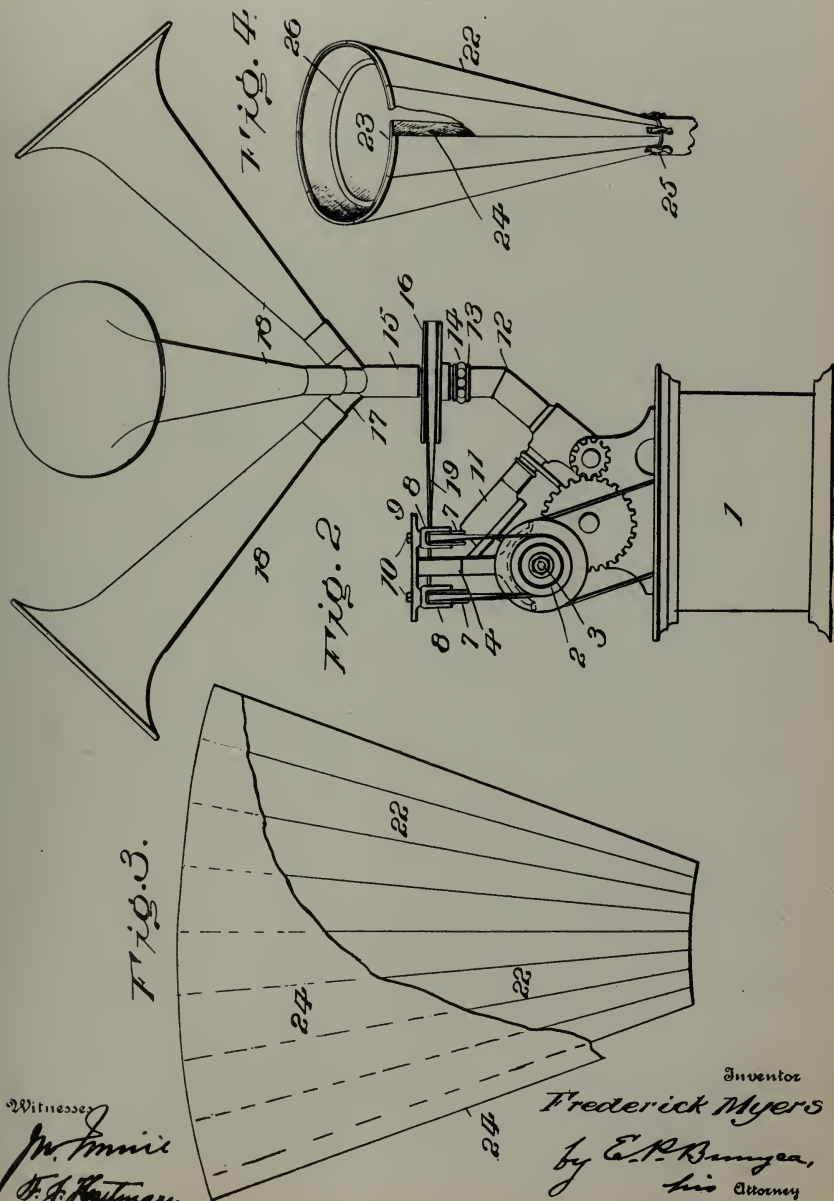
Patented Apr. 10, 1900.

F. MYERS.
GRAPHOPHONE.

(Application filed Dec. 15, 1899.)

(No Model.)

2 Sheets—Sheet 2.



Inventor

Frederick Myers
by E. P. Bungea,
his Attorney

Witnesses

J. M. Miller
F. J. Hartman

UNITED STATES PATENT OFFICE.

FREDERICK MYERS, OF NEW YORK, N. Y.

GRAPHOPHONE.

SPECIFICATION forming part of Letters Patent No. 647,147, dated April 10, 1900.

Application filed December 15, 1899. Serial No. 740,481. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK MYERS, a citizen of the United States, residing at New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Sound Transmitters or Disseminators; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to sound transmitters or disseminators for phonographs, megaphones, and similar devices; and the objects of the same are to produce a device designed to be attached to any ordinary sound-producing instrument and which will project or disseminate the sound in all directions radially from the instrument.

The defects heretofore existing in sound-reproducing instruments of the class referred to are to a great extent due to the fact that the sound is usually projected in one direction only, and while the horn or tube through which the sound is transmitted may be adjusted to project the sound in any one direction persons sitting outside the range of the horn or tube do not get the full volume or force of the music or other reproduction.

By my invention the defects referred to are entirely remedied, as by its use an audience seated in a circle around the instrument can hear equally well, the reproduction being of the same volume and scope at all points from the instrument outward. I am also enabled to produce a peculiar and pleasing effect in certain classes of music to be reproduced, said effect consisting in giving a vibratory swell or variable sound-wave character to the music, owing to the revolution given to the transmitter horns or tubes. The usual metallic or grating sounds in phonographic reproductions are to a great extent absorbed and obviated by my invention, and certain classes of music are rendered in a greatly-modulated tone and in well-measured and uniform time, owing to the fact that the revolving horns act as a speed-regulator for

the instrument and at the same time distribute the sound equally at all points around the machine.

Figure 1 is a perspective view of a graphophone having my attachment connected thereto and showing four horns or transmitter-tubes. Fig. 2 is an end view of the same, three horns or tubes being shown. Fig. 3 is a plan view of a blank for one of the horns or tubes which I may use. Fig. 4 is a perspective view of a horn or tube made from said blank. Fig. 5 is a detail perspective of a modification in the means employed for actuating or revolving the horns or tubes.

Like numerals designate like parts wherever they occur in the different views.

Referring now to Figs. 1 and 2, the numeral 1 designates a graphophone of the well-known type. Beyond placing a small pulley 2 upon the end of the record-shaft 3 no alterations or changes are made in the structure of instruments of this character. A small upright bracket 4, having feet 5 attached by screws 6 to a permanent part of the instrument, serves as a support for two idlers 7, journaled in hangers 8, pivoted at the opposite ends of a cross-bar 9 upon the ends of the screws or bolts 10. To the usual short section of tubing projecting out from the lower portion of the reproducer 11 is a tubular elbow 12, having a flange 13 surrounding its vertical portion. This flange serves as a support for a ball-bearing 14 of suitable construction, said ball-bearing being attached to a tubular section 15, having a pulley 16 rigidly connected thereto. The upper end of the tubular section 15 has three or more radially-projecting tubular nipples 17, to which the horns or tubes 18 are connected. An elastic or india-rubber band 19 passes under the pulley 2, up and over the idlers 7, and around the pulley 16.

The operation of my invention as thus far described is as follows: The reproducer 11 having been set or placed in position to start at the beginning of the record-tube the starting-lever is moved to actuate the record-shaft 3. Motion is thus imparted to the pulley 2, around which the elastic band 19 passes, and from thence the revolution is communicated to the idlers 7 and to the pulley 16, with which

the horns or tubes 18 revolve. As the reproducer 11 moves from one end of the record-tube to the other to reproduce the piece of music or other record the elastic band 19 is elongated to the extent required, and the horns or tubes 18 are thus revolved during the entire time the shaft 2 revolves. The band 19 being small and quite elastic does not absorb but little power, and as the idlers 7 are journaled in swiveled hangers they turn to direct the elastic band in a straight line to the pulley 16 and create but little friction.

As shown in Fig. 5, a rack and pinion may be used for giving revolution to the horns. The rack 20 may be attached in any suitable manner to the casing of the instrument and supported at the required height to be engaged by a pinion 21 on the tube 15. As thus arranged when the reproducer moves from end to end of the record-tube the pinion 21 engages the rack 20 and the horns 18 are revolved.

It will be obvious from the foregoing that my attachment is quite simple and inexpensive, can be quickly applied to any sound-producing instrument of the class referred to, and will project the sound outward in all directions from the instrument. The horns or tubes being connected directly to the reproducer and extending radially outward have a tendency to give the entire force or volume to the production, even though the horns were permitted to remain stationary, and for some classes of music it is deemed equally as effective to permit the horns to remain stationary by throwing the elastic band 19 off the pulley 16. Again, for certain productions I have found that a single horn if revolved will give a peculiar combined modulated and swelling effect. When stationary, I have found that at least three horns are necessary to give good results and to project the sound equally from the instrument outward.

As shown in Figs. 3 and 4, the horn or tube which I may use is made of cardboard or similar light and durable material, and such tubes may be made to occupy but little space in shipping and at the same time be inexpensive and very efficient in use. When thus made, I take a piece of cardboard and score or crease it at intervals, or a sufficient number of strips 22 of cardboard or similar material and lay them edge to edge and attach to one or both faces thereof a piece of textile fabric 23, permitting one edge 24 of the fabric to project beyond the outer strip of the series. This edge may be ready gummed, so that the tube can be readily finished by moistening the gummed edge and attaching it to the opposite edge to complete the tube, or I may use other means for securing the edges. These tubes may thus be shipped flat or folded and can be easily made up by the purchaser. To make the tubes easily attach-

able to the reproducer-nipples any suitable number of spring-fingers 25 may be connected to the small end of the tube, and a wire ring 26 may be inserted into the large end of the tube to give the necessary strength to the device, or I may use a flat or flanged ring for the end of the tube. Tubes made in this way may have a coating of aluminium paint or bronze to give them a metallic luster.

I have found that tubes or horns made of a non-metallic material have a tendency to obviate the screeching sound so common in phonographs, and, besides, their lightness in weight makes them particularly desirable for my purpose.

Certain changes in the details of construction may be resorted to without departing from the spirit and scope of my invention. Hence I do not wish to be understood as being restricted to the details shown and described.

I claim—

1. In a sound-reproducing instrument, a sound-producer, a horn or tube connected to said producer, and means for revolving said horn or tube during the operation of the instrument.

2. In a sound-reproducing instrument, a sound-reproducer, a plurality of horns attached thereto, and means for revolving said horns during the operation of the instrument.

3. An attachment for sound-reproducing instruments, comprising a plurality of horns connected to a tubular section, and means for revolving said tubular section.

4. In a sound-reproducing instrument, a tubular section, a pulley secured thereto, a plurality of horns attached to said tubular section, a belt or band passing around the pulley and around a pulley revolved from the record-shaft.

5. In a sound-reproducing instrument, a plurality of horns secured to a hollow tubular section and projecting outward and upward from the upper end thereof, hollow connections from said tubular section to the reproducer, and means for revolving said tubular section.

6. In a sound-reproducing instrument, a tubular section having a plurality of horns projecting radially from its upper end, a pulley on said tubular section, a rubber band passing around said pulley and around idlers revolved from the record-shaft, and means for revolving the pulley, substantially as described.

7. In a sound-reproducing instrument, a reproducer, a tubular elbow attached to the nipple of said reproducer, a tubular section connected to said elbow, and a plurality of horns extending radially outward from said tubular section, and means for revolving the tubular section during the operation of the instrument.

8. In a sound-reproducing instrument, a reproducer, a tubular elbow connected to

said reproducer, said elbow having a vertically-disposed member, a tubular section connected to said vertical member, a plurality of horns extending radially outward from said tubular section, and means for revolving said tubular section during the operation of the instrument.

In testimony whereof I affix my signature in presence of two witnesses.

FREDERICK MYERS.

Witnesses:

FRANCIS C. NYE,

JOS. H. S. THOMAS.

M. D. PORTER.
COLLAPSIBLE ACOUSTIC HORN.

(Application filed July 31, 1899.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

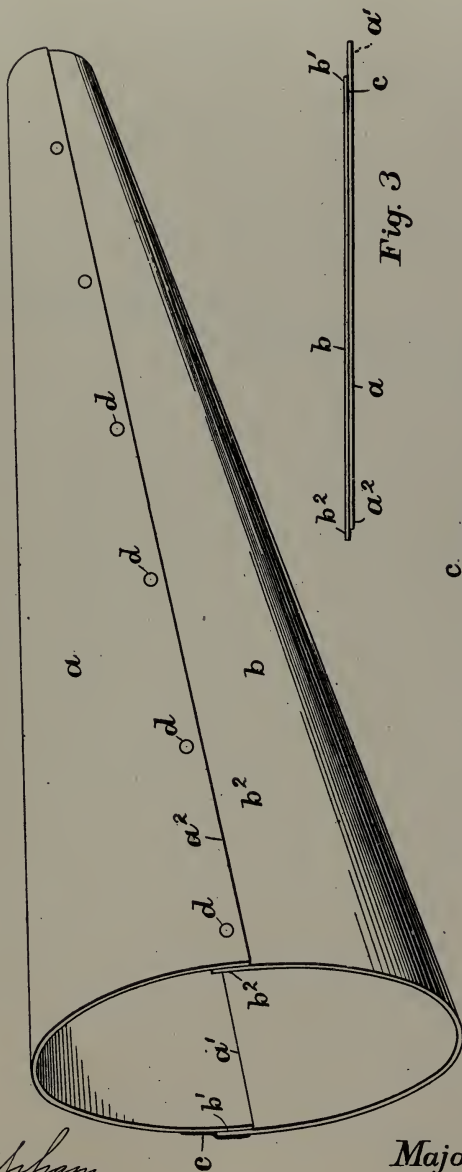


Fig. 3

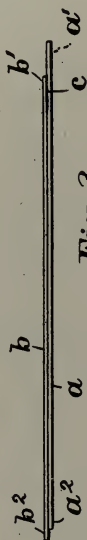
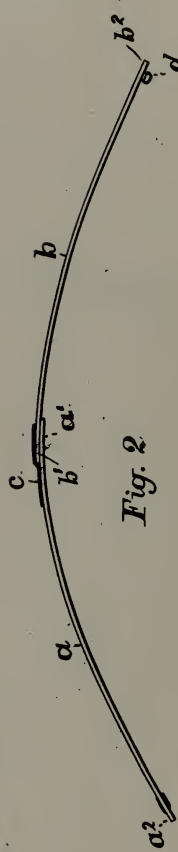


Fig. 2



Attest;

M. U. Upham
F. O. Caller

Inventor,

Major D. Porter;

By A. B. Upham
His Attorney.

M. D. PORTER.
COLLAPSIBLE ACOUSTIC HORN.

(Application filed July 31, 1899.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 4

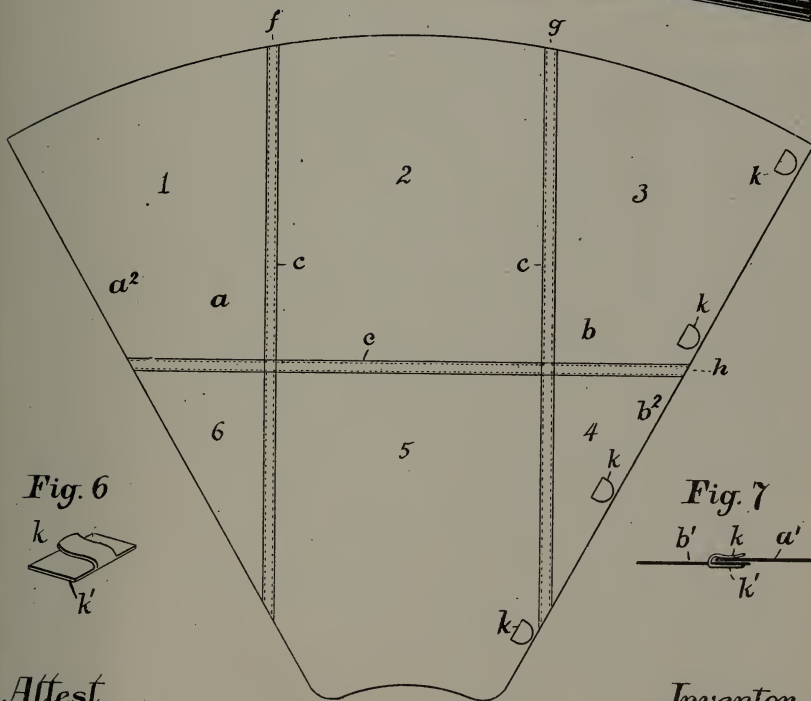
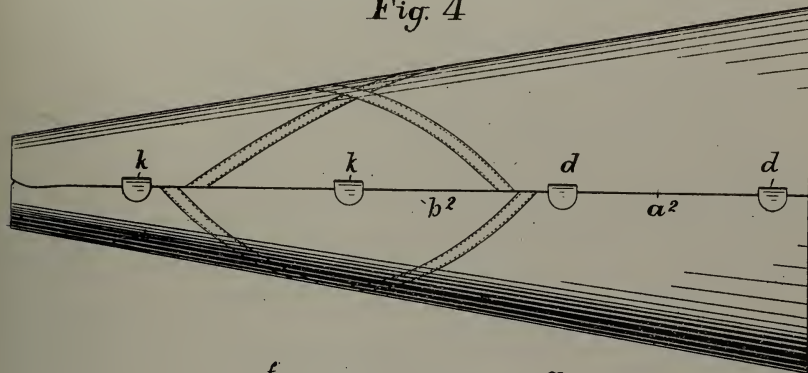
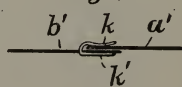
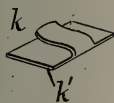


Fig. 6



Attest

M. E. Upham
F. E. Haller

Fig. 5

Inventor,
Major D. Porter;

By A. B. Upham,
His Attorney.

MAJOR D. PORTER, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO THE INTERNATIONAL STYLOPHONE COMPANY, OF SAME PLACE.

COLLAPSIBLE ACOUSTIC HORN.

SPECIFICATION forming part of Letters Patent No. 648,994, dated May 8, 1900.

Application filed July 31, 1899. Serial No. 725,634. (No model.)

To all whom it may concern:

Be it known that I, MAJOR D. PORTER, a subject of the Queen of Great Britain, residing at New Haven, in the county of New Haven and State of Connecticut, have invented a new and useful Collapsible Acoustic Horn, of which the following is a full, clear, and exact description.

The object of this invention is the construction of a horn for general acoustic purposes, such as what is usually termed a "megaphone," or for phonographs and other talking-machines, which horn shall be capable of being folded into the smallest possible compass for greater convenience in transportation and storage, and yet can be immediately expanded into its perfect and normal condition for use. In accomplishing these results I form the horn from moderately-thin press-board, celluloid, or other material capable of ready, but not too easy, bending, and divide it longitudinally into two or more sections, with certain edges hinged together and the others provided with fastening devices easily engaged or disengaged. An ordinary hinged connection will not do for this purpose, however, as I have found from experiment, for the material being pliable only to a limited degree the hinges will become the apex of a somewhat-acute angle instead of an evenly-rounded curve. To remedy this defect in a simple and inexpensive manner, I form the hinge of some fabric or other pliable material and locate the same at some little distance back from the edge of one of the sections. By this means the outjutting edge serves as a fulcrum, which compels the material itself to bend instead of the hinge, and thereby gives to the horn the circular line in cross-section which is required.

Referring to the drawings forming part of this specification, Figure 1 is a perspective view of the horn embodying my invention. Fig. 2 is a transverse section of the same with the two sections thereof unfastened at one edge. Fig. 3 is a transverse section of said sections folded back to back. Fig. 4 is a side elevation of an improved form of my horn. Fig. 5 is a plan view of this latter horn laid flat. Fig. 6 is a perspective view of my preferred form of fastening for the edges of the

horn-sections, and Fig. 7 is a detail sectional view showing the manner in which the edges of the horn-sections are held by said fastening.

Turning to Fig. 1, it will be seen that the horn is composed of the two sections *a* and *b*, held together at the edges *a'* *b'* by a hinge *c*, preferably formed of fabric or leather. As shown, said edges overlap for a short distance, usually about half an inch, in order to preserve the true curve of the horn, as above set forth. For the same purpose the section edges *a*² *b*² are made to overlap for a similar distance and provided with fastenings *d* for securing them together. Such fastenings may be the common ball-and-socket devices used for gloves and purses, as indicated in the drawings. The hinge *c* is adapted to permit the two horn-sections to be folded back to back, as in Fig. 3, and thereby enable the same to lie perfectly flat.

In my preferred construction I divide the horn into six sections, as shown in Fig. 5, in order to enable the same to be folded into the smallest possible compass. The lines of severance for this purpose are three in number *f*, *g*, and *h*, *f* and *g* running parallel to each other and *h* at right angles with the others. The last of said lines of severance *h* is adapted to be folded in either direction, but the lines *f* *g* are hinged substantially like that of the construction illustrated in Figs. 1, 2, and 3.

The fastening devices for the edges *a*² *b*² are formed, as shown in Figs. 6 and 7, where the thin base *k'* is provided with the flattened hook *k*. Said base is affixed to the under side of the edge *b*², preferably by being stitched thereto, with the hook *k* reaching through a slit therein to the upper surface thereof. (See Fig. 7.) The mouth of this hook is arranged, as in Fig. 7, in order to receive the edge *a'* of the opposite section, and the opening is slightly constricted to receive said edge quite tightly, and thereby securely retain it.

In knocking down this horn the edge *a'* is first withdrawn from the grip of the fastenings *k*, then the sections 1 and 6 are folded over upon the sections 2 and 5, then the sections 3 and 4 are brought over upon the first-named ones, and, finally, the superposed sections 4, 5, and 6 are folded over upon the

combined sections 1, 2, and 3. The entire horn now occupies a space covering no more area than the single section 2, with a thickness equal to the six layers of the material composing the horn. Thus reduced in dimensions the horn can be packed in a very small compass and is hence capable of being carried from place to place in a small grip, a coat-pocket, or similarly-convenient receptacle. While this perfectly adapts the horn for use as a megaphone easy to be carried about and yet ready for use at a moment's notice, my preferable or most valued use for the same is in connection with phonographs. By packing this horn within the case arranged for the phonograph the entire talking-machine is complete, and yet occupies substantially no more space than the sounder mechanism alone. This is a most convenient arrangement for those giving phonograph entertainments at private parties or elsewhere necessitating the machine's being carried from place to place.

What I claim as my invention, and for which I desire to secure Letters Patent, is as follows, to wit:

1. In a collapsible horn, the combination of the sections formed of resilient material and hinged together along a substantially-longitudinal line, said hinge being adapted to permit said sections to be folded back to back but will compel flexure of the material itself when the free edges of the sections are brought together to form the horn, and fastening devices for said free edges, substantially as set forth.

2. In a collapsible horn, the combination of the sections formed of resilient material and hinged together along a substantially-longitudinal line, said hinge being formed of flexible material affixed to the edge of one section and a short distance back of the corresponding edge of the other section, whereby such overlapping edge is adapted to compel flexure of the material composing said sections when they are brought into the desired conical

form, and fastening devices for the free edges of said sections, substantially as and for the purpose set forth.

3. In a collapsible horn, the combination of the sections formed of resilient material and hinged together along a substantially-longitudinal line, and the fastening devices for the free edges of said sections, said fastening devices comprising the thin flat hooks having the bases affixed to the edge of one of said sections and adapted to receive and retain the edge of the other section, substantially as set forth.

4. In a collapsible horn, the combination of the plurality of sections formed of resilient material and shaped as shown, the flexible hinges securing the same together, and the fastening devices for the free edges of said sections, substantially as set forth.

5. In a collapsible horn, the combination of the sections formed of material capable of moderately-resisting flexure, the dividing-line between said sections being substantially longitudinal, and means for securing together the edges of said sections, such means being adapted to compel flexure of the sections themselves and thereby preserve the true conical shape of the horn, substantially as and for the purpose set forth.

6. In a collapsible horn, the combination of the sections formed of resilient material, the flexible hinges uniting said sections, and the fastening devices for securing together the exposed edges of said sections, two of the division-lines of said sections being parallel and substantially longitudinal therewith and the other at right angles to said parallel lines, substantially as set forth.

In testimony that I claim the foregoing invention I have hereunto set my hand this 14th day of June, 1899.

MAJOR D. PORTER.

Witnesses:

GUY H. HOLLIDAY,
A. B. UPHAM.

No. 651,368.

Patented June 12, 1900.

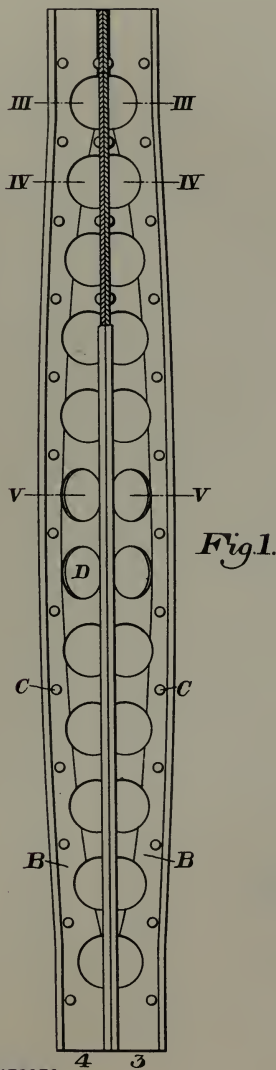
J. LANZ.

COMPOSITE METAL BEAM OR COLUMN.

(Application filed Jan. 12, 1900.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES

Warren U. Swartz
 St. M. Corwin

Fig. 2.

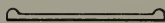


Fig. 3.

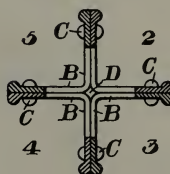


Fig. 4.

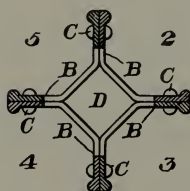
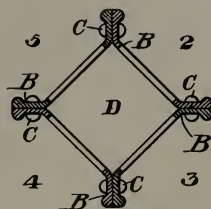


Fig. 5.



INVENTOR

John Lanz
 by Bassendell & Bassendell
 his Attorneys.

No. 651,368.

Patented June 12, 1900.

J. LANZ.

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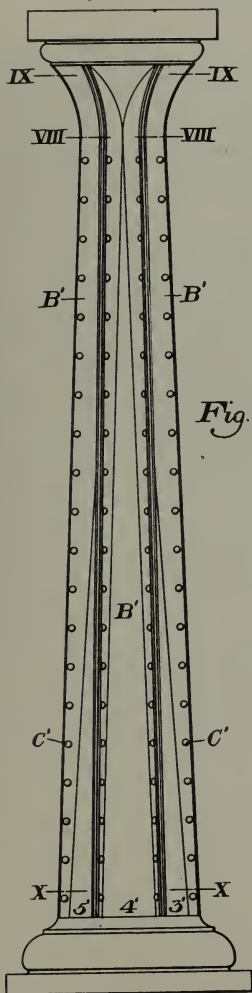


Fig. 6.

Fig. 7.



Fig. 8.

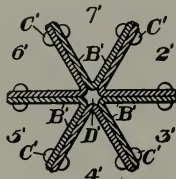


Fig. 9.

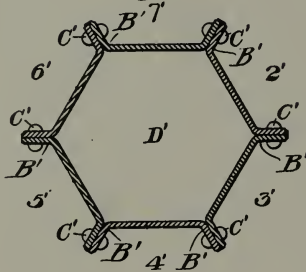
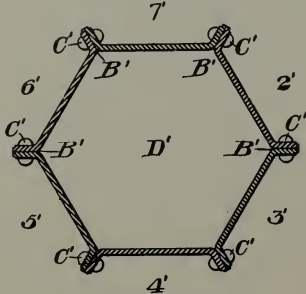


Fig. 10.



WITNESSES

Warren W. Swartz
H. M. Corwin

INVENTOR

John Lanz
by Baxendale & Baxendale
his Attorneys.

UNITED STATES PATENT OFFICE.

288

JOHN LANZ, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO MARY C. LANZ,
OF SAME PLACE.

COMPOSITE METAL BEAM OR COLUMN.

SPECIFICATION forming part of Letters Patent No. 651,368, dated June 12, 1900.

Application filed January 12, 1900. Serial No. 1,204. (No model.)

To all whom it may concern:

Be it known that I, JOHN LANZ, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Composite Metal Beams or Columns, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 shows in side elevation a composite metal bridge-beam constructed in accordance with my invention. Fig. 2 is an end view of the original form of one of the metal pieces of which the column is composed. Figs. 3, 4, and 5 are cross-sections, on a larger scale, on the lines III III, IV IV, and V V of Fig. 1, respectively. The figures on Sheet 2 show a modified construction. Fig. 6 is a side elevation of a composite column embodying my invention. Fig. 7 is an end view of one of the pieces of the column in its original shape. Figs. 8, 9, and 10 are horizontal cross-sections on the lines VIII VIII, IX IX, and X X, respectively, of Fig. 6, but on a larger scale.

The object of my invention is to provide a composite metal beam, brace, or column for use in bridge construction, buildings, &c., which shall be tapering or of varying diameter at different points of its length.

Referring to Sheet 1 of the drawings, in making my improved beam or column I take a number of metal plates or beams 2, 3, 4, and 5, which may consist either of flanged structural shapes or of unflanged metal plates, and the same being in angle form they are set with their angles in proximity and their flanges B B abutted against each other, preferably in line with radii of the beam or column and riveted together, as at C C, so as to constitute the composite beam shown in Fig. 1. In order to taper such column or beam, its elements 2 3 4 5 are shaped by pressing or otherwise so that the portions of the flanges B B which come in contact and through which the rivets pass vary in width conformably to the taper desired. The consequence is that the interior space D of the column or beam also varies in size, and the greater this space the greater will be the diameter of the composite column or beam. I am therefore enabled from metal pieces or plates of uniform size to make beams or columns having any desired taper or diameter

or variation of dimensions at different points. They may be made tapering from the bottom up, as in Fig. 6, or with a swell at the middle, as in Fig. 1. Indeed it will readily be seen that my improvement affords the greatest facility for shaping the column according to the particular use for which it is intended and for making it highly ornamental in appearance when desired.

In the figures on Sheet 2 of the drawings I show a column made of six metal plates 2' 3' 4' 5' 6' 7', which, as shown in Fig. 7, are originally unflanged, but which are pressed into angular form and are assembled with their flanges B' B' in contact and connected by rivets C' C', as above explained with reference to the figures on Sheet 1. By varying the width of the flanges B' the column is made of tapering form.

Within the scope of my invention as defined in the claims many changes may be made by the skilled mechanic, since

What I claim is—

1. A composite column, brace, or beam, made up of metal pieces of uniform width and angular form, having meeting flanges which are fastened together, said meeting flanges being varied in width at different points to vary the diameter of the column; substantially as described.

2. A composite metal beam or column made up of four pieces, 2, 3, 4, 5, of uniform width and angular form set with their angles in proximity to each other and with their flange portions fastened together, said flange portions being varied in width to impart to the beam or column varying diameters at different points; substantially as described.

3. A composite column, brace or beam made up of metal pieces of uniform width formed with suitable angles, having riveted flanges lying in a radius from the center of the column, said parallel flanges being varied in width to conform to the taper or diameter of the column desired at any point of its length; substantially as described.

In testimony whereof I have hereunto set my hand.

JOHN LANZ.

Witnesses:

H. M. CORWIN,
GEO. B. BLEMING.

GRAPHOPHONE, PHONOGRAPH, OR THE LIKE.

(Application filed June 3, 1901.)

(No Model.)

2 Sheets—Sheet 1.

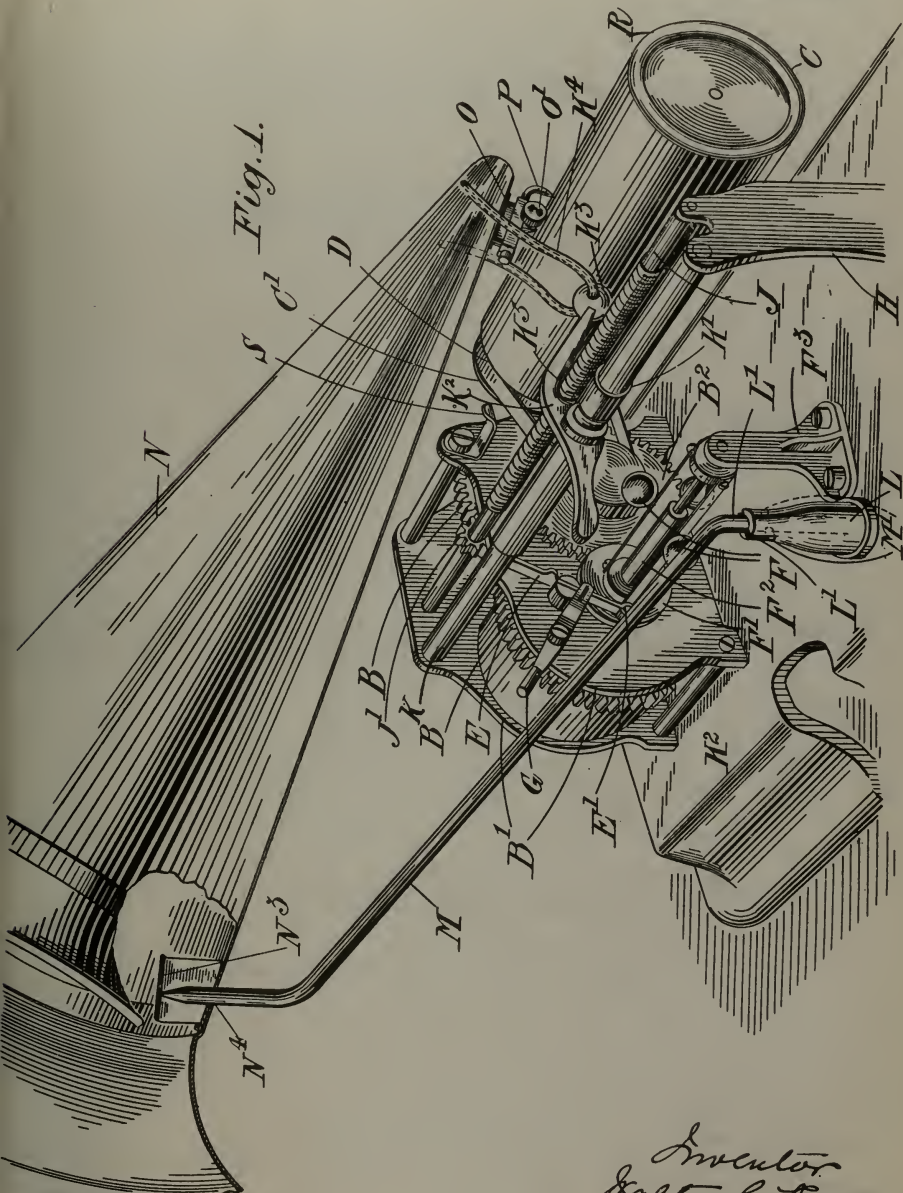


Fig. 1.

Inventor
Walter C. Runge
by Louis Freeman
Attorneys

Witnesses
H. J. Gilman, Jr.
J. J. M. & Carthy,

GRAPHOPHONE, PHONOGRAPH, OR THE LIKE.

(Application filed June 3, 1901.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 4.

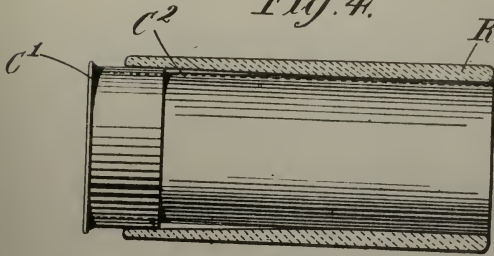


Fig. 5.

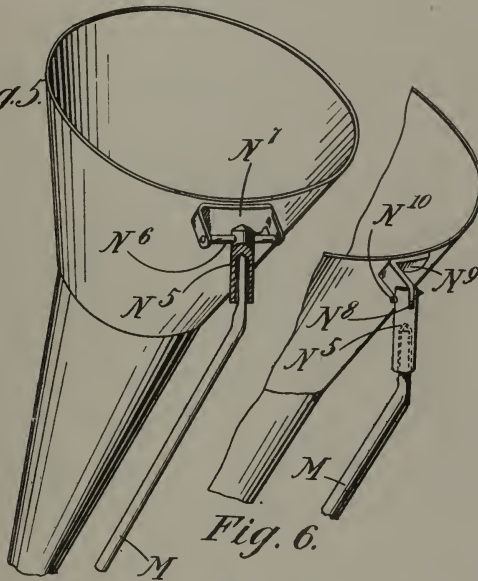


Fig. 6.

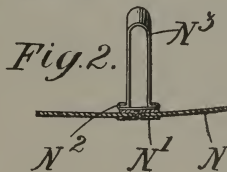


Fig. 2.

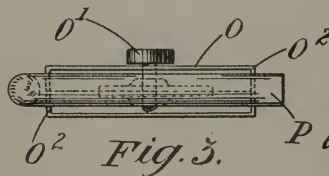


Fig. 3.

Inventor
Walter C. Runge
by
Solon Sherman
Attorneys.

Witnesses
H. J. Gillman
J. J. McCarthy

WALTER C. RUNGE, OF LONDON, ENGLAND.

GRAPHOPHONE, PHONOGRAPH, OR THE LIKE.

SPECIFICATION forming part of Letters Patent No. 692,363, dated February 4, 1902.

Application filed June 3, 1901. Serial No. 62,991. (No model.)

To all whom it may concern:

Be it known that I, WALTER C. RUNGE, a citizen of the United States of America, residing in London, England, have invented certain new and useful Improvements in or Relating to Graphophones, Phonographs, or the Like, (for which application has been made in Great Britain under No. 9,727, dated May 10, 1901,) of which the following is a specification.

This invention relates to graphophones, phonographs, and other like instruments for reproducing sounds from records, its object being the construction of an instrument which, while thoroughly efficient in operation, is simple and cheap to manufacture.

The improvements are primarily applicable to instruments which are not provided with a diaphragm at the small end of the trumpet, but have a stylus of hardened material attached to some part of the trumpet, the point of this stylus following the channels or grooves of the record in the well-known way. It is, however, to be understood that the improvements are not necessarily restricted to this particular type of instrument.

In the accompanying drawings, Figure 1 is a perspective view of one construction of graphophone embodying the improvements according to this invention. Figs. 2, 3, and 4 are detailed views showing portions of the instrument separately, and Figs. 5 and 6 are perspective views showing alternative constructions of another portion of the instrument.

Like letters indicate like parts throughout the drawings.

With reference first to Fig. 1, A is a base-plate, preferably of cast metal of considerable thickness, so that it may be heavy and rigid. Upon this base is fixed a motor, comprising in the example illustrated a train of wheels B, mounted between two plates B', one member B² of the train being preferably of hard fiber or other non-metallic material. From this motor a record-carrying mandrel C is driven by means of a belt D and a pulley C'. The train of wheels forming the motor is driven from a spring coiled in a barrel B³ and wound up when necessary, and the rate of rotation of the record-mandrel C may be regulated by a lever E, controlled by a screwed

rod or other mechanism. (Not shown in the drawings.) One end of this lever E is furnished with a brake-block E'—say of leather— 55 which presses against a disk F', connected to governors F, the action of the governors being to draw the disk F' away from the plate B' along a rod F², supported between that plate and a standard F³, secured to the base A. A lever G is provided, by means of which 60 the motor may be started and stopped.

Mounted free to turn between the outer plate B' and a standard H is a fine-threaded screw J, provided with a pinion J', which is 65 driven from one of the wheels B. Parallel to this screw J and also held between the plate B' and the standard H is a rod K, which forms a guide upon which a sleeve K' can travel and turn. This sleeve K' forms part of a pivoted guide-carrier comprising also a lever K², 70 a head K³, and a guide-fork K⁴, the arms of the latter being covered with rubber tubing or other soft or yielding material. Normally the guide-carrier K² K³ lies upon the fine- 75 threaded screw J, as shown in Fig. 1, and it is provided with a knife-edge K⁵ or otherwise adapted to engage with the thread of the screw J, so that when the latter rotates the guide-carrier may be caused to travel along 80 the bar K.

Upon the base-plate A is a socket L, having a central vertical hole which accommodates the end of a rod M, the pointed extremity of which serves as a pivot to support the 85 larger end of a sound-trumpet N. Slots L' are provided in the socket L, and pins M' upon the rod M engage with these slots when the rod M is in the socket, thus securing a definite position for the pivot of the sound- 90 trumpet.

The sound-trumpet N may be made of any suitable material, preferably non-metallic—such, for instance, as tough paper, thin fiber, or celluloid. When sheet material, such as 95 celluloid, is employed, the trumpet is conveniently made by providing the edges of the sheet with metal strips or grips, as shown at N' in Fig. 2, these strips being joined—say 100 by soldering. In some constructions only one strip is used, its edges being turned over, so as to grip the edges of the sheet material of which the trumpet is formed. To the strips N' inside the larger end of the trumpet is at-

3 5 10 15 20 25 30 35 40 45 50 55 60

tached a small clip N², forming a slide, into which the edges of a U-shaped piece of metal N³ are inserted. The pointed end of the rod M passes through a hole N⁴ and rests against the inside of the curved portion of the U-shaped piece N³. This U-shaped member is preferably formed so that the longitudinal portion which rests upon the point of the rod M is approximately horizontal, thus obviating the danger of any binding action taking place.

Near the smaller end of the trumpet N a socket O is provided to accommodate the stylus P, which may be of any hard material—say, for instance, glass rod or tubing. The socket O is preferably formed of spring metal and provided with a screw O', so that the stylus may be securely gripped. In the construction shown in detail in Fig. 3 the ends of the socket are turned in, as at O², so that the stylus is gripped by each end of the socket, the clamping-screw O' being in the middle.

In operation the larger end of the trumpet is pivoted, as above described, on its supporting-rod M, the smaller end passes between the arms of the fork K⁴ of the pivoted carrier, and the point of the stylus P rests upon a record-cylinder R, which is mounted friction-tight upon the mandrel C. This mandrel may be made, as shown in Fig. 4, of a piece of light tubing C², the diameter of which corresponds to that of the smaller end of the coned interior of the record R. At one end the tube C² is secured to a ring which fits the inside diameter of the larger end of the record R and conveniently forms part of the pulley C'. This ring may, if desired, be slightly coned in order to fit the adjacent portion of the interior of the record.

It is to be understood that the apparatus is so constructed that the point of the stylus P rests with a slight amount of pressure upon the record R. The guide-carrier K² K³ and fork K⁴ are not intended to take the weight of the trumpet, their function being primarily to act as a guide for the smaller end of the trumpet and prevent any danger of the point of the stylus quitting the grooves or channels in the record.

In order that the point of the stylus P may be withdrawn from contact with the record R or any adjacent part of the mechanism when the instrument is not in use, a small safety catch or bracket S is provided, attached to one of the plates B'. By depressing the back end of the carrier-lever K² the knife-edge K³ is disengaged from the screw J and the lower end of the trumpet, with the stylus P, is lifted in the guide-fork K⁴, and the head K³ is then allowed to rest in the catch S, in which position the stylus is out of contact with adjacent portions of the instrument.

The rest or catch is not necessarily in the form of the bracket S. It may, for example, be formed by causing the arms of the fork K⁴ to approach one another in a V shape below the portion receiving the trumpet, so that

when the back end of the lever K² is depressed this contracted or V-shaped part of the fork engages with, say, the back of the stylus-clip and lifts it, with the trumpet, clear of the record.

Figs. 5 and 6 show portions of sound-trumpets made according to an alternative construction of this invention. In each of these forms a pivoted socket N⁵ is provided, which accommodates the pointed end of the rod M. In Fig. 5 this socket is shown provided with a cross-arm N⁶, which is journaled in the downturned ends of a plate N⁷, attached to the trumpet. In the form shown in Fig. 6 the socket N⁵ is slotted, as at N⁸, and in this slot is a lug N⁹, secured to the trumpet, the lug and the slotted socket being pivotally connected by a pin N¹⁰.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a graphophone, the combination with the mandrel and record, of means for rotating the mandrel, a sound-trumpet and pivotal means for supporting its larger end, means for supporting its smaller end, a pivoted guide for the smaller end of the trumpet, means for feeding said guide, and means for rocking said guide on its pivot, substantially as described.

2. In a graphophone, the combination with the mandrel and record, of means for rotating the mandrel, a sound-trumpet and pivotal means for supporting its larger end, an adjustable socket attached to the smaller end of the trumpet, a stylus secured in said socket and adapted to rest upon the record and support the smaller end of the trumpet, a screw and means for rotating the same, a rod arranged parallel to said screw, a pivoted guide-carrier slidably mounted upon said rod and adapted to engage said screw, a fork carried by said guide-carrier and arranged to guide the smaller end of the trumpet, means for rocking said guide-carrier on its pivot to lift the smaller end of the trumpet and the stylus clear of the record, and means for holding the stylus out of contact with adjacent parts of the mechanism when the instrument is out of operation, substantially as described.

3. In a graphophone, the combination with the mandrel and record, of means for rotating the mandrel, a sound-trumpet and pivotal means for supporting the larger end of the same, a stylus connected to the trumpet and adapted to rest upon the record and support the smaller end of the trumpet, a pivoted guide for the smaller end of the trumpet, means for feeding said guide, and means for rocking it on its pivot to lift the stylus from the record, substantially as described.

4. In a graphophone, the combination with the mandrel and record, of means for rotating the mandrel, a sound-trumpet and pivotal means for supporting the larger end of the same, a stylus connected to the trumpet and adapted to rest upon the record and support the smaller end of the trumpet, a pivoted, slidably-mounted guide-carrier supporting a

guide for the trumpet, means for feeding said guide-carrier, and means for rocking it upon its pivot to lift the stylus from the record, substantially as described.

5. In a graphophone, the combination with the mandrel and record, of means for rotating the mandrel, a sound-trumpet, means for supporting the smaller end of the trumpet, and means for pivotally supporting the larger end of the trumpet, consisting of a vertical socket provided with vertical slots, a bent rod supported in said socket and provided with pins engaging said slots and also provided with a pointed extremity entering a hole in the side of the larger end of the trumpet, and a U-shaped piece over said hole within the larger end of the trumpet and arranged with a substantially horizontal longitudinal portion resting upon the point of the bent rod, substantially as described.

6. In a graphophone, the combination with the mandrel and record, of means for rotating the mandrel, a sound-trumpet, and means for supporting its larger end, consisting of a vertical socket provided with slots, a bent rod supported in said socket and provided with pins engaging said slots, said rod being also provided with a pointed extremity entering a hole in the side of the larger end of the trumpet, and a U-shaped piece over said hole within the larger end of the trumpet and arranged with a substantially horizontal longitudinal portion resting upon the point of the rod, an adjustable socket attached to the smaller end of the trumpet, a stylus secured herein and adapted to rest upon the record and support the smaller end of the trumpet, a screw rotatably mounted parallel to the axis of the record, means for rotating the same, a

pivoted guide-carrier slidably mounted upon a rod and adapted to engage said screw, a fork carried by said guide-carrier and arranged to guide the smaller end of the trumpet, means for rocking said guide-carrier on its pivot to lift the smaller end of the trumpet and the stylus clear of the record, and means for holding the stylus out of contact with adjacent parts of the mechanism when the instrument is out of operation, substantially as described.

7. In a graphophone, the combination with the mandrel and record, of means for rotating the mandrel, a sound-trumpet, means for supporting the larger end thereof, consisting of a socket provided with slots, a rod supported in said socket and engaging the slots said rod being provided with a pointed extremity entering a hole in the side of the larger portion of the trumpet, and a U-shaped piece within the trumpet having an approximately horizontal longitudinal portion resting upon the point of the rod, a stylus connected to the trumpet adapted to rest upon the record and support the smaller end of the trumpet, a screw, means for rotating the same, a pivoted, slidably-mounted guide-carrier adapted to engage said screw and provided with a fork to guide the smaller end of the trumpet, and means for rocking said carrier on its pivot to lift the stylus from the record, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WALTER C. RUNGE.

Witnesses:

HAROLD WADE,

HARRY B. BRIDGE.

No. 699,928.

Patented May 13, 1902.

C. McVEETY & J. F. FORD.

SHIP'S VENTILATOR.

(Application filed July 10, 1901.)

(No Model.)

FIG. 1.

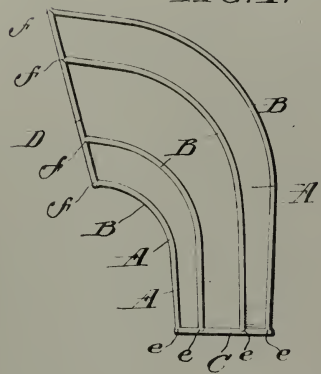


FIG. 4.

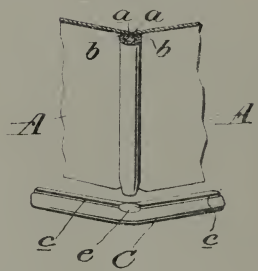


FIG. 2.

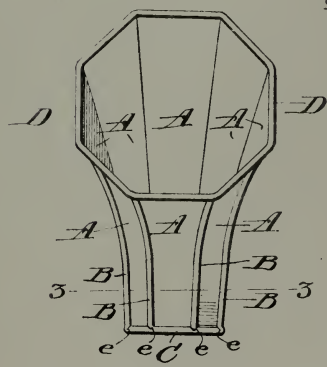
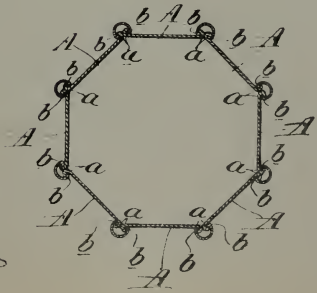


FIG. 3.



WITNESSES:

William J. Sterling
Richard H. Sharp

INVENTORS

Charles McVeety
John Ford
By their attorney
Walter H. Calhoun

UNITED STATES PATENT OFFICE.

CHARLES McVEETY AND JOHN F. FORD, OF PHILADELPHIA, PENNSYLVANIA.

SHIP'S VENTILATOR.

SPECIFICATION forming part of Letters Patent No. 699,928, dated May 13, 1902.

Application filed July 10, 1901. Serial No. 67,714. (No model.)

To all whom it may concern:

Be it known that we, CHARLES McVEETY and JOHN F. FORD, citizens of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Ships' Ventilators, of which the following is a specification.

Referring to the accompanying drawings, forming part of this specification, Figure 1 illustrates a side elevation of a ventilator constructed in accordance with our invention. Fig. 2 represents a front elevation of the same. Fig. 3 shows a horizontal section on the line 3-3 of Fig. 2; and Fig. 4 represents a detached perspective view of a portion of the ventilator, showing the manner of uniting the parts.

The object of our invention is to construct a ventilator of that type known as "ships' ventilators" in the simplest and most economical manner, the plates of which the ventilator is made being stamped out in one operation, requiring no delicate bending and fitting, as is required in other types of ships' ventilators.

Referring to the reference-letters of the drawings, A represent the plates, which are of varying width and provided at the sides with upturned portions *a*, forming grooves for the reception of the ribs B, which are in the form of split tubes, the inward-projecting portions *b* being adapted to engage the grooves of the plates A.

In Figs. 1, 2, and 3 of the drawings we have shown the ventilator constructed of eight plates or sections forming an octagonal figure in cross-sections and at the base and mouth. It will be understood, however, that any num-

ber of plates, as A, may be employed without departing from the scope of our invention.

As shown in Fig. 4, the plates A at the base and mouth of the ventilator are covered with beadings C and D, having slots *c* and *d* to receive the plates A and openings *e* and *f* to receive the ribs B. The beadings C and D are firmly-secured by brazing metal to the plates A and ribs B.

Having described our invention, what we claim, and desire to secure by Letters Patent, is—

1. A ventilator comprising in combination with a series of curved plates of gradually-increasing width having upturned edges forming grooves, a series of split tubes or ribs for engaging the grooves of said plates, and ribs arranged at the base and mouth having grooves engaging the plates and openings to receive the ribs substantially as specified.

2. A ventilator comprising a curved tapered pipe octagonal in cross-section composed of plates A, having upturned end forming grooves, ribs B in the form of split tubes for engaging and holding said plates in position, and ribs C and D arranged respectively at the base and mouth of the ventilator having slotted openings to receive the plates and openings for the ribs, substantially as specified.

In testimony whereof we affix our signatures in presence of two witnesses.

CHARLES McVEETY.
JOHN F. FORD.

Witnesses:

C. P. S. GARWOOD,
H. E. COUGHLIN.

No. 705,126.

Patented July 22, 1902.

G. OSTEN & W. P. SPALDING.
HORN FOR SOUND RECORDING AND REPRODUCING APPARATUS.

(Application filed June 27, 1901.)

(No Model.)

Fig. 6.

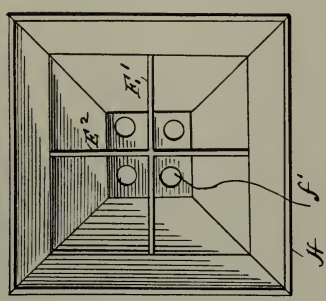


Fig. 3.

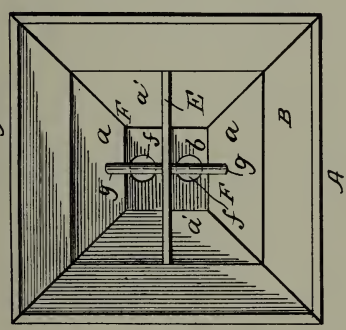
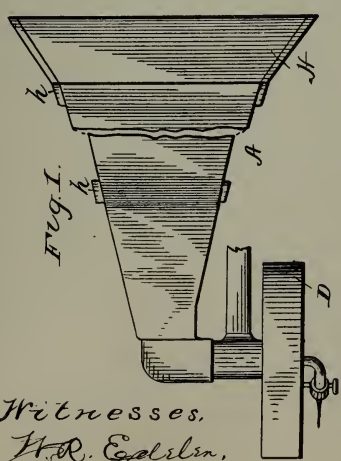


Fig. 1.



Witnesses,
H. R. Eschlin,
Geo. F. Davis.

Fig. 4.

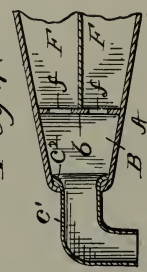


Fig. 5.

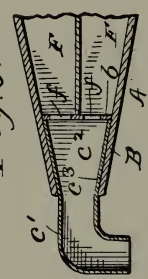
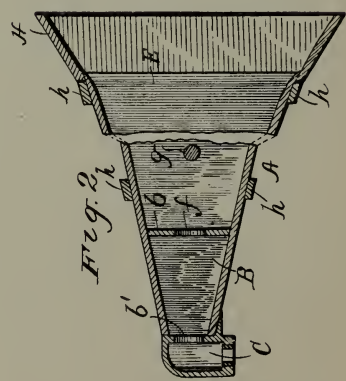


Fig. 2.



Inventors
George Osten and
William P. Spalding
by Philip Mauro att.

UNITED STATES PATENT OFFICE.

GEORGE OSTEN AND WILLIAM P. SPALDING, OF DENVER, COLORADO.

HORN FOR SOUND RECORDING AND REPRODUCING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 705,126, dated July 22, 1902.

Application filed June 27, 1901. Serial No. 66,301. (No model.)

To all whom it may concern:

Be it known that we, GEORGE OSTEN and WILLIAM P. SPALDING, residents of Denver, Colorado, have invented a new and useful Improvement in Horns for Sound Recording and Reproducing Apparatus, which invention is fully set forth in the following specification.

Our Patent No. 685,409, dated October 29, 1901, claims a multiple horn consisting of a plurality of small horns all communicating at their smaller ends with one and the same recorder or reproducer and a hood or bell common to all of the small horns and into which said small horns discharge or from which they receive the sounds at their larger ends.

Although the apparatus of our present invention, in its preferred form, includes the features of construction above referred to, as well as the transmitter described in said patent, the present invention is designed more particularly as an improvement upon the patented invention.

We have discovered that a large horn, of any suitable material, partitioned into a plurality of small horns by a partition or partitions, preferably of wood, acting as a sounding-board, gives improved results, and that still better results are obtained by the use of sound-posts in conjunction with the sounding-board partition or partitions. The manner in which we utilize these discoveries will be best understood by reference to the accompanying drawings, illustrating several embodiments of our invention, and wherein—

Figure 1 is a plan view showing a recorder or reproducer connected with the horn. Fig. 2 is a longitudinal sectional view of the horn. Fig. 3 is a view looking into the large end of the horn. Figs. 4 and 5 are views illustrating modifications of the elbow leading to the recorder or reproducer. Fig. 6 is a view looking into the larger end of a modified construction of horn.

A is the body of the horn, which, as shown, is made of four tapering thin wooden sides $a a' a'$, secured together along their edges, thus forming a body part of rectangular cross-section. The body part may, however, be made of circular, oval, or any other suitable shape in cross-section.

B is a distributing chamber or mouth at

the small end of the horn, bounded at one end by a transverse partition or wall b . At its smaller end mouth B communicates, through an opening b' , with a throat C, leading through a wooden elbow or short tube c , which is secured to the small end of the horn. Elbow or short tube c may be bent, as shown, or straight. At its outer end throat C communicates with a reproducer or recorder D, Fig. 1.

E is a sounding-board extending forward from partition b , secured at its side edges to the opposite sides $a' a'$ of body A and longitudinally dividing the interior of the latter into two small horns F F, which communicate with the distributing chamber or mouth B through openings ff in partition b on opposite sides of the sounding-board E.

$g g$ are two sound-posts interposed between the sounding-board E and the sides $a a$. They communicate vibrations from the sounding-board to the sides of the horn, and vice versa.

$h h$ are outside strips or ribs extending across sides $a' a'$ in a direction practically parallel to the sound-posts and acting to strengthen the tone and vibrations, as well as making the horn more durable. The sound-posts and ribs are of special importance, as they act in practically the same manner as do the sound-post and ribs of a violin. They improve the tone quality by softening and mellowing the same, at the same time increasing the carrying properties and distinctness of the sounds, particularly where the horn is made completely of wood. The metallic sound so common to sound recording and reproducing apparatus is effectually eliminated.

Any double effect that may otherwise be produced by the sounds coming from the two small horns F F is avoided by the action of the single bell or hood H, into which both of said small horns discharge, said hood causing the sounds coming from the separate small horns to blend together before they are finally discharged from the horn. As shown in the drawings, hood H is also made of wood and secured to the end edges of sides $a a' a'$.

As shown in Fig. 4, the elbow c' instead of being made of wood, as in Figs. 1 and 2, is made of brass or other suitable metal and has a flared or bell-shaped end c'' opening into the distributing-chamber B. Fig. 5 illustrates a somewhat-similar arrangement, the flared or

bell-shaped end c^3 of the elbow in this casing being of such length as to constitute a lining for the chamber B.

In the form of horn shown in Fig. 6 two sounding-boards $E^1 E^2$, disposed at right angles to each other longitudinally, divide the interior of the horn into four small horns, each communicating with the distributing-chamber, such as shown in Fig. 2, through an opening f^1 . As the sounding-boards bear against all of the sides of the horn, no sound-posts are necessary in this arrangement.

What we claim is—

1. In sound recording and reproducing instruments, the combination of a multiple horn comprising a plurality of small horns separated from each other by a sounding-board, with a sound recorder or reproducer in communication with said multiple horn.

2. A multiple horn comprising a plurality of small horns separated from each other by a sounding-board and a common distributing chamber or mouth with which the small horns communicate at their smaller ends.

3. A multiple horn comprising a wooden body part divided interiorly into a plurality of small horns by a wooden sounding-board.

4. A horn comprising a plurality of small horns separated from each other by a sounding-board, a common distributing chamber or mouth with which the small horns communicate at their small ends, and a hood or bell common to all of the small horns and into which said small horns discharge or from which they receive the sounds at their larger ends.

5. A horn comprising a body part adapted to communicate at its small end with a recorder or reproducer, a lateral partition in the body part forming a mouth or distributing-chamber at the smaller end of the horn,

and a longitudinally-extending sounding-board dividing the interior of the body part outside of the mouth into two small horns communicating with the mouth through openings in the lateral partition.

6. A horn comprising a body part adapted to communicate at its small end with a recorder or reproducer, a lateral partition in the body part forming a mouth or distributing-chamber at the smaller end of the horn, a longitudinally-extending sounding-board dividing the interior of the body part outside of the mouth into two small horns communicating with the mouth through openings in the lateral partition, and a hood or bell common to all of the small horns and into which said horns discharge or from which they receive the sounds at their larger ends.

7. A horn for use with apparatus for recording and reproducing sounds having a sounding-board longitudinally disposed therein.

8. A horn for use with apparatus for recording and reproducing sounds having a sounding-board longitudinally disposed therein and a sound-post interposed between the sounding-board and side wall of the horn.

9. A wooden horn for use with apparatus for recording and reproducing sounds having a wooden sounding-board longitudinally disposed therein and a sound-post interposed between the sounding-board and side wall of the horn.

In testimony whereof we have signed this specification in the presence of two subscribing witnesses.

GEORGE OSTEN.

WILLIAM P. SPALDING.

Witnesses:

W. A. RICE,

L. GOLDMAN.

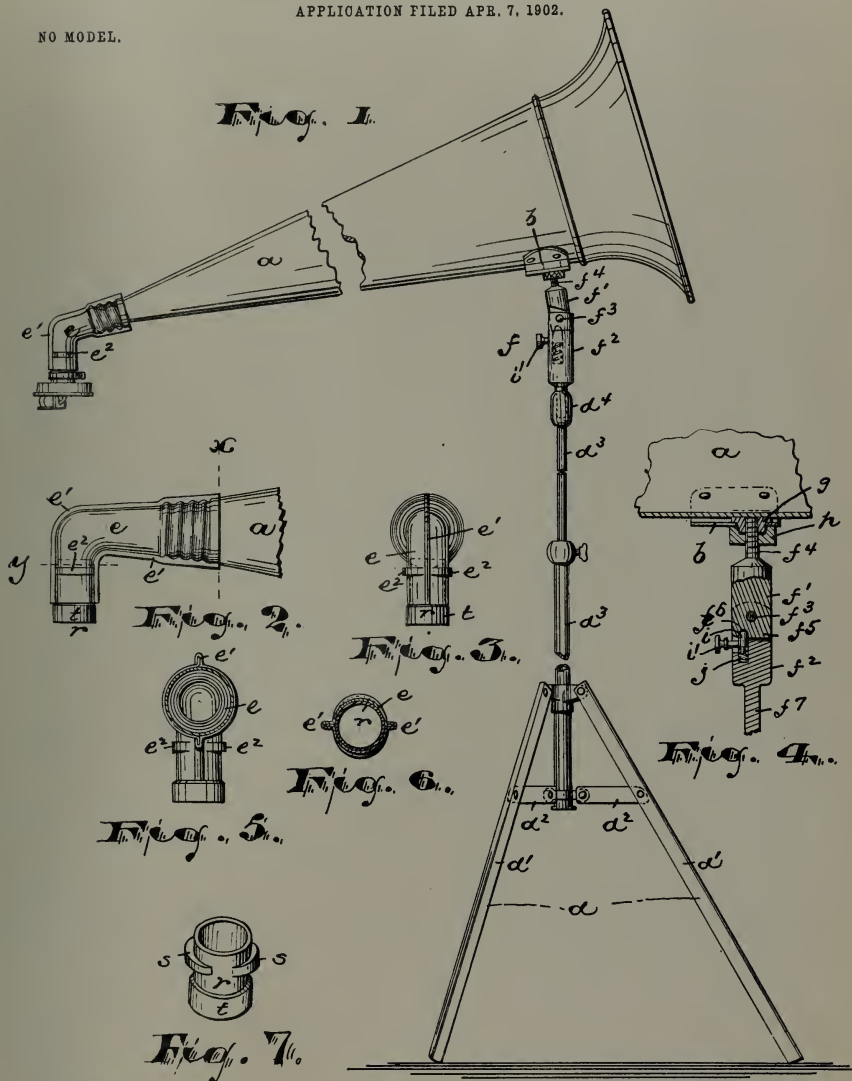
No. 738,342.

PATENTED SEPT. 8, 1903.

A. S. MARTEN:
INTERCHANGEABLE SOUND AMPLIFYING MEANS FOR TALKING
OR SOUND REPRODUCING MACHINES.

APPLICATION FILED APR. 7, 1902.

NO MODEL.



WITNESSES:

Harry Krag

Russell M. Everett

INVENTOR

Albert S. Marten,

BY

BY
Drake & Co.
ATTORNEYS

UNITED STATES PATENT OFFICE. 300

ALBERT S. MARTEN, OF EAST ORANGE, NEW JERSEY.

INTERCHANGEABLE SOUND-AMPLIFYING MEANS FOR TALKING OR SOUND-REPRODUCING MACHINES.

SPECIFICATION forming part of Letters Patent No. 738,342, dated September 8, 1903.

Application filed April 7, 1902. Serial No. 101,648. (No model.)

To all whom it may concern:

Be it known that I, ALBERT S. MARTEN, a citizen of the United States, residing at East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Interchangeable Sound-Amplifying Means for Talking or Sound-Reproducing Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to certain improvements in that class of sound-amplifying connections for phonospheres, phonographs, graphophones, gramophones, and similar sound recording and reproducing machines illustrated in the application filed in the United States Patent Office January 24, 1902, Serial No. 91,032, the objects of the present improvements being to increase the convenience with which interchanges of the horn and talking-machines can be effected to facilitate construction and secure a more efficient operation of the parts and to obtain other advantages and results, some of which may be more fully and specifically referred to hereinafter in connection with the description of the working parts.

The invention consists in the improved interchangeable sound-amplifying means for talking or sound-reproducing machines and in the arrangements and combinations of parts of the same, all substantially as will be hereinafter set forth, and finally embraced in the clauses of the claim.

Referring to the accompanying drawings, in which like letters of reference indicate corresponding parts in each of the several figures, Figure 1 is an elevation showing a horn supported upon a stand, said horn being separably attached to the diaphragm-box or speaker of a sound-reproducing machine. Fig. 2 is a detail showing the small end of the horn, on which is a tubular metallic connection having a rubber or other elastic connection inserted therein. Fig. 3 is an end view of the same. Fig. 4 shows in detail an upper extension of the stand; and Figs. 5

and 6 are sectional views taken at lines *x* and *y*, respectively. Fig. 7 is a detail view of a certain elastic washer.

In said drawings, *a* indicates the horn, which is of the construction described in my said prior application, being provided at its small end with a screw-thread and near its large end with a socket *b*, adapted to receive the vertical center post of the stand *d*. Separably attached to the said small end of the horn is a short rigid metallic tube *e*, threaded in correspondence with the threads on the horn, and thus adapted to be screwed firmly and tightly to the horn, so that there will be no looseness at the joint conducive to vibration and an interference with proper sound reproductions. Said metallic tube *e* is also separable and independent from the diaphragm-box or speaker.

The stand *d* is preferably of the folding type, having legs *d'*, braces *d''*, and the center-post *d'''*, the latter being in telescopic sections. The center-post is provided at the top with a socket *d'* for a separable extension *f*, the latter comprising pieces *f'*¹ *f'*², hinged together, the hinge-pin being shown at *f''* in Figs. 1 and 4. At the top of the upper section *f'* the same is threaded, as at *f'*¹, and provided with clamp-plates *g* *h*, one to enter the socket and the other to clamp the parts in rigid immovable relation, the second being preferably a finger-nut, threaded to properly engage the threads *f'*¹. At the lower end of the extension section or part *f'* the same is provided with a stop-bearing *f''*¹ to engage the lower section or part *f'*² and limit the pivotal movement of the upper member *f'*, so that it will stop when it arrives at a position of vertical alinement with the lower section *f'*² and the post *d'''*. The said lower end of the section or part *f'* is also provided at *f'*² with a socket to receive the projecting end of a latch-bolt *i*, arranged in a spring-chamber formed in the section or part *f'*². Below said latch-bolt a spring *j* is arranged in said chamber to throw the latch-bolt into its locked position. The latch-bolt has a lateral finger-piece *i'*, by which it can be pressed down against the spring *j* to release the section or part *f'* to permit the turning of the member or part *f'* to a horizontal position and the horn to a vertical position, as hereinafter described. At the lower end of the part or

3
section f^2 the same is reduced in diameter to form a leg f^7 to enter the socket d^4 , where it may be removably secured or allowed to rest free to be withdrawn at will.

5 By uncoupling the small end of the horn and pressing down upon the finger-piece i the horn will assume a vertical position because of the arrangement of the socket described, the small end of the horn overbalancing the
10 large end and the latter lying uppermost. The vertical arrangement of the horn on the stand permits the horn to be set aside in a corner, where it will not occupy much floor-space and without detaching said horn from its stand,
15 the bell thus lying free from the floor away from danger of injury.

The construction described, taken in connection with separable coupling-tubes suited to the machine with which the horn is to be used,
20 enables a rigid connection to be made with the machine and yet permits of a quick detachment without removing the horn from the stand. The tubular connection preferred for the disk-machines and the phonosphere is
25 angularly formed and pressed in half-sections from sheet metal, each section having a flange e' extending around the angle from one end of the tube to the other, one of the flanges being wider than the other, and thus adapted
30 to be doubled over the other to hold the sections together, as shown in Fig. 5. At one end of each section of the tube e the metal is impressed with screw-threads which correspond, so that when the sections are joined the
35 threads will be continuous spirals suited to receive the threads of the horn. At the opposite end of the tube the sections are indented or impressed to form hollow outwardly-projecting bosses e^2 . The cavities formed on the inside of the bent tube are adapted to receive
40 stay ribs or lugs s , cast or formed on the periphery of an elastic washer r . Said washer fits closely within the end of the tube e and is held therein by the ribs or lugs s , which are adapted to spring into place in the cavities
45 when the washer is forced into the tube. The elastic washer at one end is formed with an outward annular rib on its periphery, which forms a shoulder against which the end of
50 the metallic tube abuts. By this construction the tube e can be fitted closely upon the tubular extension of the speaker or diaphragm-box without danger of looseness due to variations in diameter of said tubular extensions or the interference with proper sound reproductions
55 because of such looseness.

To change the horn from a phonograph to a phonosphere, for example, it becomes only necessary to withdraw the tubular extension
60 suited to the phonograph from the speaker or diaphragm-box of said phonograph, unscrew the said tubular connection, the horn being

held at the desired horizontal position to facilitate the work, then apply the angular and threaded connection e by screwing it upon the horn, and finally pushing the cushion-like or elastic washer thereof upon the speaker of the phonosphere, thus enabling the one horn to serve with either of the various talking-machines.

Having thus described the invention, what I claim as new is—

1. The combination with the horn and speaker or diaphragm-box, of a tubular metallic connection separable from the horn and having at its end distant from the horn an elastic washer having a detent holding said washer within said connection when withdrawing the same from the diaphragm-box, and adapted to engage the said diaphragm-box, substantially as set forth.

2. The combination with the horn having a threaded small end, of a tubular connection screwed at one end on said horn and thereby removably fixed against movement in the direction of the longitudinal axis of the said horn and at the opposite end having an elastic rubber washer fitted therein and adapted to receive the speaker or diaphragm-box, substantially as set forth.

3. The combination with the horn having a threaded small end, of a tubular connection screwed on said small end, and having at its end opposite that receiving the horn, an elastic washer, the connection being interiorly indented to form a hollow recess and the washer being provided with lugs to enter said hollow recess, substantially as set forth.

4. The combination with the horn, speaker, diaphragm-box and stand, of a rigid, angular, metallic tube, interposed between said horn and box and separable from both said horn and said box, said tube being in sections, flanged and joined together at their edges, substantially as set forth.

5. The combination with the horn, diaphragm-box and stand, of a coupling-tube adapted to be secured to the horn and provided with means to resist longitudinal movement, or movement both inward and outward in the direction of the longitudinal axis of the horn from the said horn, and having an india-rubber washer secured in the end thereof opposite that having said means for resisting said longitudinal movement and adapted to closely fit speakers or diaphragm-boxes of varying diameters, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 29th day of March, 1902.

ALBERT S. MARTEN.

Witnesses:

CHARLES H. PELL,
C. B. PITNEY.

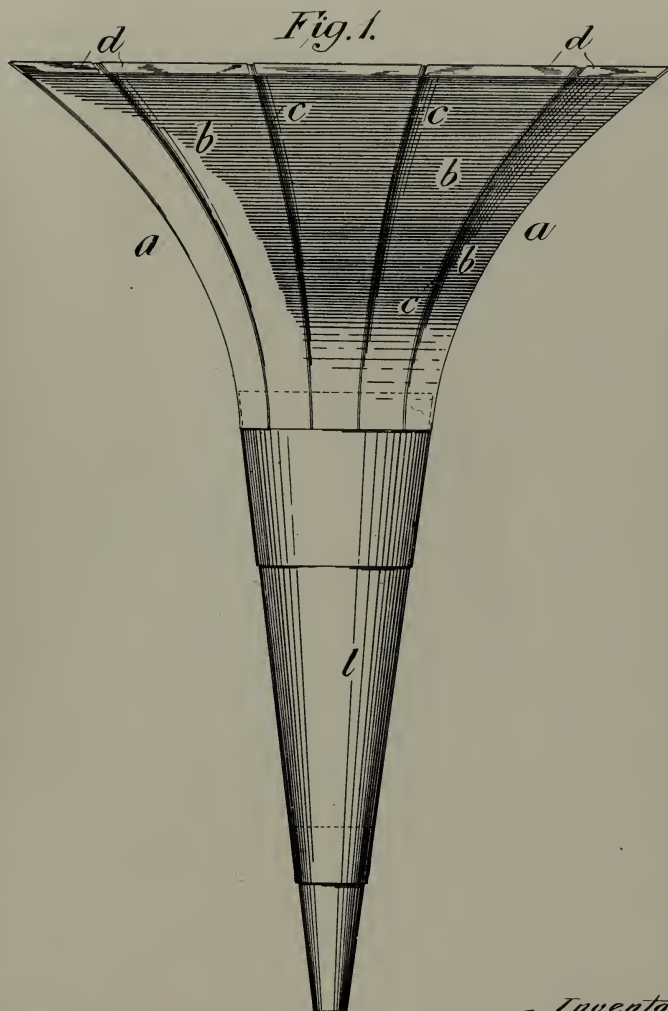
G. H. VILLY.

HORN FOR PHONOGRAPHS, EAR TRUMPETS, &c.

APPLICATION FILED DEC. 8, 1902.

NO MODEL.

3 SHEETS—SHEET 1.



Witnesses:
L. Hilton
A. Veazie

- Inventor -
Gustave H. Villy
 By *H. Blaisson & Co*
 Attorneys -

No. 739,954.

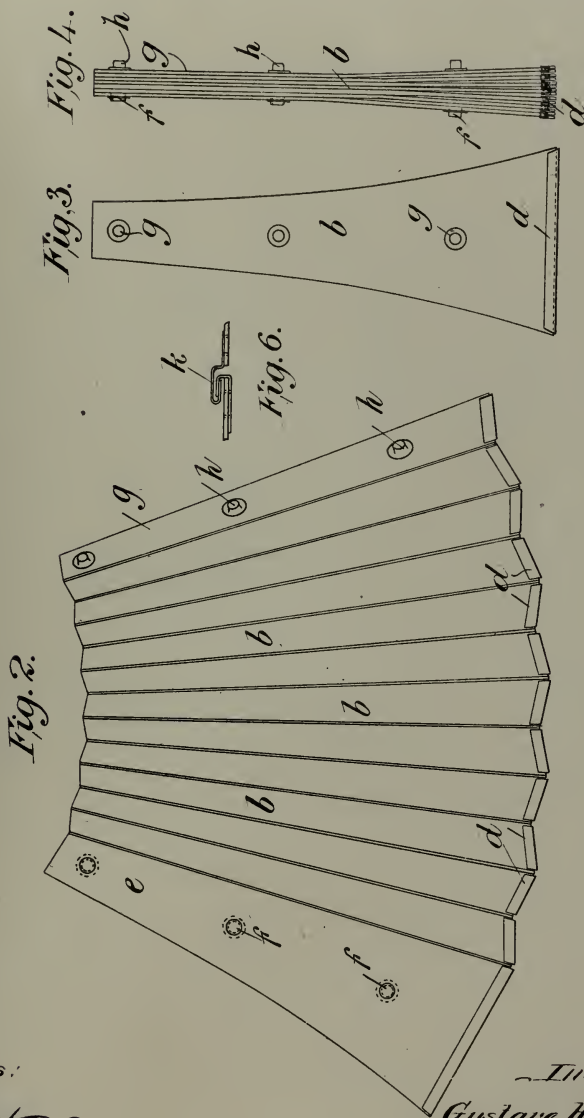
PATENTED SEPT. 29, 1903.

G. H. VILLY.
HORN FOR PHONOGRAPHS, EAR TRUMPETS, &c.

APPLICATION FILED DEC. 8, 1902.

NO MODEL.

3 SHEETS—SHEET 2.



Witnesses:

L. Hilton
A. Veazie

Inventor

Gustave H. Villy

By H. B. Wilson & Co.

Attorneys

No. 739,954.

PATENTED SEPT. 29, 1903.

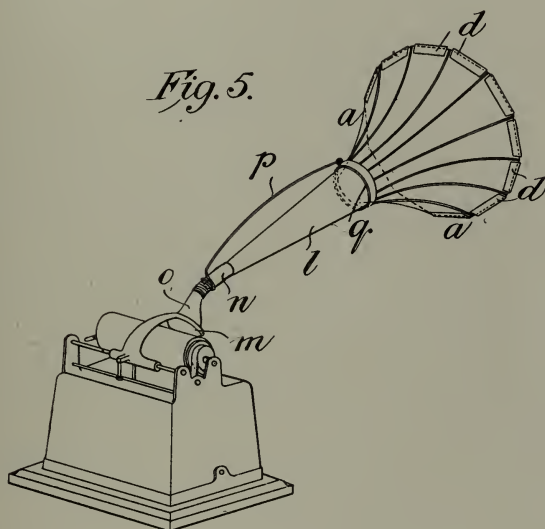
G. H. VILLY.

HORN FOR PHONOGRAPHS, EAR TRUMPETS, &c.

APPLICATION FILED DEC. 8, 1902.

NO MODEL.

3 SHEETS—SHEET 3.



Witnesses

Hilton
Veazie

Inventor.

Gustave H. Villy.

By

H. W. Wilson & Co

Attorneys

UNITED STATES PATENT OFFICE.

GUSTAVF HARMAN VILLY, OF MANCHESTER, ENGLAND.

HORN FOR PHONOGRAPHS, EAR-TRUMPETS, &c.

SPECIFICATION forming part of Letters Patent No. 739,954, dated September 29, 1903.

Application filed December 8, 1902. Serial No. 134,413. (No model.)

To all whom it may concern:

Be it known that I, GUSTAVE HARMAN VILLY, a subject of the King of Great Britain and Ireland, residing at 5 Longford Place, Longsight, Manchester, in the county of Lancaster, England, have invented certain new and useful Improvements in Connection with Horns for Phonographs, Ear Instruments, and for Like Purposes, (for which I have made application for Letters Patent in Great Britain, No. 20,146, and dated 15th day of September, 1902,) of which the following is a specification.

This invention relates to improvements in connection with horns or trumpet-like sound distributors or collectors for use upon phonographs, gramophones, and other like instruments and also for ear-trumpets, fog-horns, and other sound distributing and collecting devices, the object being to provide a horn or trumpet-like device which can be folded when not in use, so as to be capable of ready transportation and for placing within the case of the phonograph or in the pocket of the user when it is to be applied to an ear instrument or the like.

The accompanying drawings represent one form of the invention.

Figure 1 is an elevation of the complete or erected horn. Figs. 2, 3, and 4 are detail views illustrating the manner in which the horn can be collapsed or folded. Fig. 5 is a perspective view illustrating one convenient application of the improved horn to a phonograph. Fig. 6 is a detail view on an enlarged scale.

In carrying my invention into effect in one convenient manner when making my folding horn for use, particularly in connection with a phonograph or like instrument, I make the end *a* of trumpet-like or curved configuration with an enlarged outer end and a smaller end at the interior of the conoidal-like form. I make this enlarged and trumpet-like device by employing a series of strips *b*, of paper, wood, linen, or other preferably flexible material, the foundations of which I prefer to make of linen or the like, so as to form a hinge-like connection *c* between each of the strips, the members *b* of which I arrange so that while lying close together when extended

there is a dividing-line between them about which they can be folded upon the base of linen or the like connecting-web upon which the paper or other material is mounted. The longitudinal hinged edges *c* of the flexible segments or sectors *b* are curved in such manner that although the segments when opened out cannot lie in the same plane they can either be folded together in a zigzag manner, so as to lie parallel to one another, as shown in Figs. 2 to 4, or extended by springing or buckling into the requisite trumpet or bell-like form, as shown in Figs. 1 and 5. The angles formed by the meeting of the hinged segments when extended form, as it were, ribs, giving rigidity to the trumpet form. The outer ends of the segmental-like strips I prefer to protect by a bent or turned-over edging *d* of metal, making the connection rigid by pressing a portion of the strip of metal or other binding material into the edge of the paper or the like foundation.

Upon the extreme member *e* of the series of strips *b* thus formed into one band, provide eyelets for other clip-like devices for enabling snap projections *h* on the opposite end strip *g* to be engaged therewith and when thus engaged to form a completed trumpet-like sound-distributor.

Instead of arranging eyelets or hook-like clips upon the outer members of the series of strips I may make one to engage with the other by forming a bead-like connection or flange *k* upon one member, into which the corresponding projecting or engaging portions of the other may enter, as shown in Fig. 6. When providing for an extension and a long funnel-like carrier for the built-up trumpet-like end *a* to engage with, I sometimes make a conical tube *l*, the enlarged end of which engages with the inner end of the trumpet-terminal *a*, while the smaller end of the cone engages with the receiver *m* of the phonograph or enters into the rubber or other tubular or flexible connection which may be employed for use upon any particular instrument. I prefer to make this extended or carrying member *l* for the collapsible trumpet from paper or other suitable material built up in a similar manner to that hereinbefore described to my collapsible end, or the

cone may be made in a short length in one piece, or it may be made telescopic when so desired.

When providing for a flexible connection at the extreme end of the cone *l*, I attach a length of rubber or the like tubing *n*, which I bind with metal or other band at the end for the purpose of inserting it upon the funnel *o* of the phonograph-reproducer, and I stiffen the combination trumpet and funnel with flexible end by providing one or more bars *p* of metal or the like stiffeners which support the funnel by means of elastic or other connections *q*, arranged upon the cone end and suspended from the projecting stiffening hook or members *p*, carried from the metal end or binder of the flexible tube *n*.

When constructing a funnel or tube for an ear-trumpet or for a fog or speaking horn or the like, I employ the same method of building up the segments to form the expanding-surface, modifying the arrangement of the inner end to suit the connection that is to be made therewith, so that when the trumpet is in use it can be extended and a large outer area exposed for the collection of sound and when not in use it can be folded, each segment upon the other, so as to occupy but little space—that is to say, a trumpet such as illustrated in Figs. 1 to 4 would be suitable as an ear-trumpet.

I am aware that it has hitherto been proposed to form conical or pyramidal horns from cardboard provided with a linen foundation; but such horns have been made up from a single flat scored sheet or from a number of flat triangular strips having straight edges. Such horns could be developed or laid out upon a flat surface. Owing to their formation if such horns were made collapsible they would have to be sustained in their conical form by additional sustaining means, or if they were made self-sustaining they could not be made collapsible. In contradistinction to this my collapsible horn could not be made up from a single flat sheet, as each strip has to be made with curved edges, and when the strips are flexibly secured together at such curved edges the whole or complete surface so formed cannot be laid out or developed on a flat surface. My horn, owing to the curvature of the edges of the strips, is self-sustaining and requires no additional stiffening or sustaining devices, although when it is desired to collapse the horn this may be effected by forcibly straightening and folding the strips one against the other in the manner hereinbefore described with reference to Figs. 2, 3, and 4. The horn when erected offers a decided resistance to such straightening or folding sufficient to render it self-sustaining against all ordinary shocks liable to be encountered; but it is found that when one strip has been forcibly straightened or folded

against another the equilibrium of the trumpet is destroyed and the whole may be easily collapsed.

I do not limit the application of my invention to any particular method of building up the segments or to any special curve or configuration of the same, and I vary the method of jointing and stiffening them to suit the material from which the strips are constructed and the foundation or base fabric upon which the flexible material forming the strips is secured.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A collapsible but self-sustained phonograph-horn, ear-trumpet or the like comprised of a number of flexible strips having curved meeting edges substantially as set forth.

2. A collapsible but self-sustained phonograph-horn, ear-trumpet or the like comprising a number of flexible strips having curved meeting edges and mounted on a flexible foundation, substantially as and for the purposes hereinbefore set forth.

3. A collapsible but self-sustained phonograph-horn, ear-trumpet or the like comprising a number of flexible strips having curved meeting edges, a flexible foundation for said strips and means for detachably securing the two extreme strips together, substantially as set forth.

4. A collapsible but self-sustained phonograph-horn, ear-trumpet or the like comprising a number of flexible strips having curved meeting edges, flexible connections between such edges and protecting means on the outer exposed edges, substantially as set forth.

5. A phonograph-horn, ear-trumpet or the like comprising a rigid conical tube and a collapsible trumpet-shaped mouth the latter being made up of a number of flexible strips having curved meeting edges, and flexible connections at such edges, substantially as hereinbefore set forth.

6. A horn of the class described comprising a rigid conical tube, and a collapsible trumpet-shaped mouth made up of a number of flexible strips having curved meeting edges, said mouth being connected to said rigid conical tube, substantially as described.

7. A horn of the class described comprising a rigid conical tube, and a collapsible trumpet-shaped mouth made up of a number of flexible strips having curved meeting edges, said mouth being telescopically connected to said conical tube, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

GUSTAVE HARMAN VILLY.

Witnesses:

DORA VILLY,
V. A. B. HUGHES.

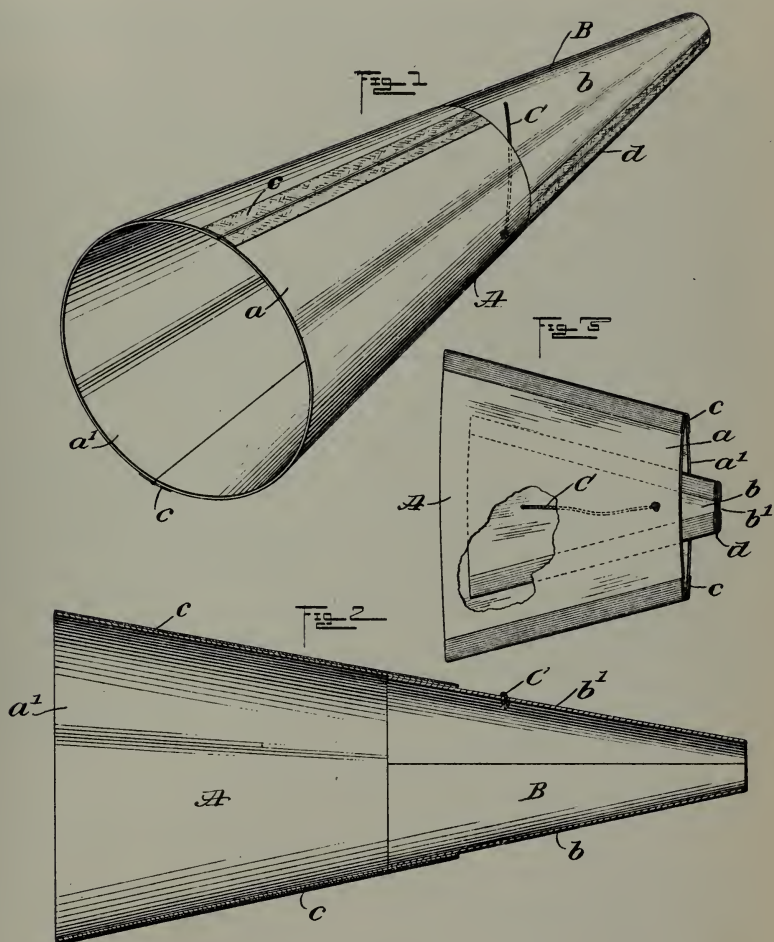
No. 748,969.

PATENTED JAN. 5, 1904.

C. MELVILLE.
MEGAPHONE.

APPLICATION FILED JULY 24, 1903.

NO MODEL.



WITNESSES:

*Sp. C. Chmery**N. J. Bernhofer*

INVENTOR

Colin Melville

BY

Munn & Co

ATTORNEYS

UNITED STATES PATENT OFFICE.

COLIN MELVILLE, OF NEW YORK, N. Y.

MEGAPHONE.

SPECIFICATION forming part of Letters Patent No. 748,969, dated January 5, 1904.

Application filed July 24, 1903. Serial No. 166,828. (No model.)

To all whom it may concern:

Be it known that I, COLIN MELVILLE, a citizen of the United States, and a resident of the city of New York, (City Island, borough of the Bronx,) in the county and State of New York, have invented a new and Improved Megaphone, of which the following is a full, clear, and exact description.

My invention relates to improvements in megaphones; and the object that I have in view is to produce a collapsible article which may be folded compactly to facilitate storage and transportation and at the same time may be easily and quickly adjusted in a way which prevents collapsing of its parts, so that the device can be used like an ordinary rigid megaphone.

Further objects and advantages of the invention will appear in the course of the subsequent joined description and the novelty will be defined by the annexed claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a perspective view of my collapsible megaphone, showing the sections thereof adjusted in position for service. Fig. 2 is a longitudinal sectional elevation through the megaphone in the position shown by Fig. 1; and Fig. 3 is a plan view, partly broken away, showing the sections of the megaphone adjusted one within the other and collapsed or folded compactly for storage and transportation.

As shown by the drawings, the megaphone consists of a plurality of sections, as A B, which are of collapsible construction in order that the section B may fold compactly within the section A. (See Fig. 3.) The section A consists of two members or pieces *a a'*, which are united at their edges by pliable bindings *c*, whereby the parts *a a'* are permitted to fold laterally into a flat condition. The other section, B, consists of parts or members *b b'*, united by pliable bindings *d*, so that the section B may fold laterally into a compact form, as shown by Fig. 3. The sections A B are of conical or tapered form, and the section B is smaller than the section A, in which it is adapted to fit telescopically, as shown by Fig. 2.

Each section may have its parts made of heavy cardboard, linoleum, leather, or any similar material, and the parts of each section are held together by bindings *c* or *d*, of fabric or suitable material. Each section has a tendency to collapse or fold, and the section B is adapted to slide within the section A when it is desired to pack or carry the article. The displacement or relative movement of the sections is limited by the employment of a pliable connection, which is represented in the drawings in the form of a cord, tape, or the like at C. One end of this limiting cord or tape is attached to the section B, while its other end is fastened to the section A in a suitable way, and this limiting-cord is of such length as to permit the section B to have an endwise and turning movement within the section A.

Assuming that the article is in its collapsed condition, as in Fig. 3, the section B is drawn outward and given a quarter-turn in order to bring its joints in a position at right angles to the joints of the sections A, the cord C limiting the movement of the sections relatively to one another. The turning movement of the section B is advantageous, because it brings the two sections into such positions that the tendency of one to collapse is counteracted by the other section, whereby the sections are held in their proper positions when it is desired to use the article in the ordinary way. To fold the megaphone, the sections (or one of them) are turned so as to bring the joints into the same plane, whereupon the sections are free to collapse, and the section B can be slid into the section A within the limit of the length of the cord or tape C.

I do not desire to strictly confine myself to the employment of any particular number of sections nor to the described means for limiting the relative movement of the sections nor to any particular material for making the sections, because these details may be varied within wide limits by a skilled constructor.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A megaphone consisting of collapsible

sections foldable one within the other and fitted telescopically together.

2. In a megaphone, a tapering member formed of sections of resilient material hinged together longitudinally at diametrically opposite sides, and means for holding said tapering member in circular form, said sections being adapted to normally fold into flat engagement with each other when released from said holding means.

3. A megaphone consisting of a plurality of tapering members each formed of sections longitudinally hinged together, each member being collapsible, and one member being turnable with respect to the other, whereby the tendency of the members to collapse is counteracted by the engagement of one member with the other.

4. A megaphone consisting of tapering telescopic sections each being provided with diametrically opposite longitudinal joints and

collapsible, one section being turnable with respect to the other.

5. A megaphone consisting of tapering sections hinged together longitudinally to fold one upon the other, the sections being fitted telescopically one to the other, and means for limiting the relative movement of said sections.

6. A megaphone, consisting of tapering telescopic sections, each formed of two pieces of resilient material provided with longitudinal hinges diametrically opposite each other, the hinges of two adjoining sections being in planes at right angles to each other.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

COLIN MELVILLE.

Witnesses:

J. P. DAVIS,
JNO. M. RITTER.

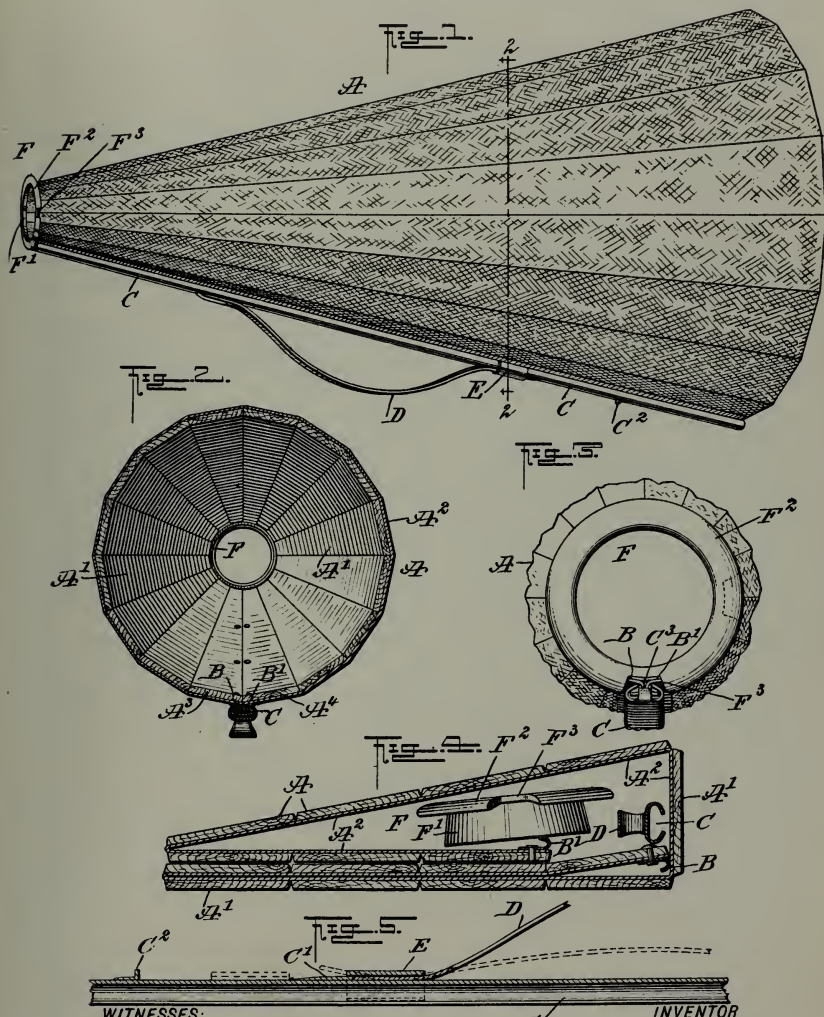
No. 763,808.

PATENTED JUNE 28, 1904.

H. STURGES.
COLLAPSIBLE MEGAPHONE.

APPLICATION FILED FEB. 2, 1904.

NO MODEL.



WITNESSES:

Geo. C. Cheney
Reed. H. Foster

INVENTOR

Hollister Sturges

BY

Mumford

ATTORNEYS

HOLLISTER STURGES, OF NEW YORK, N. Y.

COLLAPSIBLE MEGAPHONE.

SPECIFICATION forming part of Letters Patent No. 763,808, dated June 28, 1904.

Application filed February 2, 1904. Serial No. 191,666. (No model.)

To all whom it may concern.

Be it known that I, HOLLISTER STURGES, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Collapsible Megaphone, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved megaphone adapted to be collapsed and folded into comparatively little space for convenient storing aboard ship or other place and adapted to be quickly and readily extended for use.

The invention consists of novel features and parts and combinations of the same, as will be more fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a perspective view of the improvement in position for use. Fig. 2 is a transverse section of the same on the line 2 2 of Fig. 1. Fig. 3 is an enlarged end elevation of the improvement. Fig. 4 is an enlarged longitudinal sectional view of the collapsed body, with the locking-slide and mouthpiece shown in elevation; and Fig. 5 is an enlarged longitudinal sectional elevation of the locking-slide and the means for securing the free end of the handle to the slide.

The body A of the collapsible megaphone when extended for use (see Fig. 1) is approximately in the shape of a split truncated cone or many-sided pyramid and is formed of slats A', connected with each other by a fabric A², such as canvas, which fabric forms a cover for the slats and also hinges to hingedly connect the sides of the slats with each other to allow convenient folding of the slats when the body is collapsed. (See Fig. 4.)

The adjacent slats A³ and A⁴ along the split of the body A are provided on the outside with longitudinally-extending guideways B and B', preferably made of metal and adapted to be engaged by a locking-slide C for securely fastening the adjacent edges of the slats A³ and A⁴

together to securely hold the body A in an extended position—that is, in the form of a truncated cone or many-sided pyramid. As shown in the drawings, the side edges of the slats are somewhat beveled, so that when the body A is extended for use the edges of adjacent slats fit snugly together to produce a strong and durable body A.

As shown in Fig. 1, the locking-slide C and the guideways B and B' extend throughout the length of the body A, and on the said slide C is secured one end of a handle D, preferably made of spring metal, adapted to be taken hold of by the operator for using the megaphone for its legitimate purpose. The free end of the handle D is adapted to be engaged by a sleeve E, slidably held on the slide C to firmly lock the free end of the handle in place at the time the said free end abuts against a projection or lug C', formed integrally on the locking-slide C, as plainly indicated in Fig. 5. When the slide C is withdrawn from the guideways B and B' and the body A is collapsed and folded, then the handle D can also be folded snugly against the side of the slide C by the operator moving the sleeve E outwardly to release the free end of the handle D and allow the latter to lie flat against the slide C. In order to prevent the sleeve E from accidental disengagement from the slide C, a stop C² is provided, against which the sleeve E can abut when not in use.

The mouthpiece F for the megaphone is in the form of a beveled ring F', fitting the inside surface of the body A at the apex end, and the said ring F' is provided at its apex end with an outwardly-extending flange F², adapted to abut against the ends of the slats, so as to prevent the mouth of the user of the megaphone from coming in contact with the rough edges of the slats and the canvas. By having the outer side of the ring beveled to correspond to the conical shape of the body A it is evident that the ring F' is securely held in place on the megaphone when the latter is extended or set up; but the mouthpiece can be turned in the apex end of the body A to move a notch F³ in the flange F² in or out of register with the guideways B and B' and the slide C. When the notch F³ is in regis-

ter with the guideways B and B' and the slide C, then the latter can be placed in position on the guideways or removed therefrom; but when the slide C is in position in the guideways and the ring is turned so as to move the notch F³ out of register with the end of the slide and the guideways then the slide C is held against accidental displacement on the guideways B and B'. The slide C is provided with an inturned lug C³ (see Fig. 3) at the apex end of the megaphone for the lug to abut against the ends of the guideways to prevent the slide C from moving out of position in an outward direction on the guideways B and B'.

When the megaphone is extended, as shown in Fig. 1, and it is desired to collapse the megaphone, then the operator first turns the mouthpiece F until the notch F³ is in register with the guideways B and B' and the slide C, and then the latter is withdrawn from the guideways through the notch F³ to unlock the body A to allow of folding the same, as indicated in Fig. 4, at the same time allowing removal of the mouthpiece F and storing the same in the folded body A, as indicated in Fig. 4. The slide C may also be placed within the folded body A, as shown in Fig. 4, it being understood that after the slide is removed the handle D is unlocked and folded to take up little room on the slide C, as previously explained.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

35 1. A collapsible megaphone comprising a body in the form of a split truncated cone, a ring in the apex end of the body, and means for locking and unlocking the sides of the cone at its split, said means being adapted to bring the edges of the cone at its split, into abutting engagement with each other, as set forth.

2. A collapsible megaphone comprising a body in the form of a split truncated cone and made of slats, hingedly connected with each other, the slats at the split being provided with longitudinal guideways, and a locking-slide for removably engaging the said guideways, as set forth.

3. A collapsible megaphone comprising a body in the form of a split truncated cone and made of slats, hingedly connected with each other, the slats at the split being provided

with longitudinal guideways, a locking-slide for removably engaging the said guideways, and a handle on the said locking-slide, as set forth.

4. A collapsible megaphone comprising a body in the form of a split truncated cone and made of slats, hingedly connected with each other, the slats at the split being provided with longitudinal guideways, a locking-slide for removably engaging the said guideways, a flexible handle attached at one end to the said slide, and means on the slide for engaging the free end of the said handle, as set forth.

5. A collapsible megaphone comprising a body in the form of a split truncated cone and made of slats, hingedly connected with each other, the slats at the split being provided with longitudinal guideways, a locking-slide for removably engaging the said guideways, a flexible handle attached at one end to the said slide, a lug on the said slide, for the free end of the handle to abut against, and a sleeve on the slide, for engaging the free end of the handle, to lock the same in place against the lug, as set forth.

6. A collapsible megaphone comprising a body in the form of a split truncated cone, made in foldable sections, a locking device for locking the sides of the split together, and a mouthpiece consisting of a ring provided with beveled sides fitting the inside of the said body at the apex and a flange on the said ring, fitting the apex edge of the body, as set forth.

7. A collapsible megaphone comprising a body in the form of a split truncated cone, made in foldable sections, a locking device for locking the sides of the split together, and a mouthpiece consisting of a ring provided with beveled sides fitting the inside of the said body at the apex and a flange on the said ring, fitting the apex edge of the body, the flange having a cut-out portion for the passage of the movable member of the said locking device, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HOLLISTER STURGES.

Witnesses:

THEO. G. HOSTER,
EVERARD BOLTON MARSHALL.

E. A. SCHOETTEL.
PROCESS OF MANUFACTURING HORNS.

APPLICATION FILED FEB. 18, 1904.

NO MODEL.

Fig. 1.

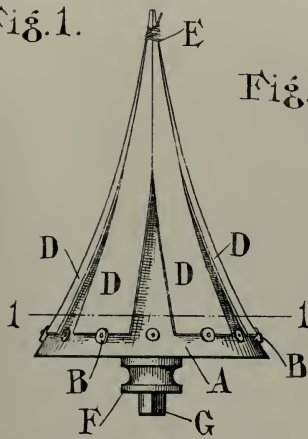


Fig. 3.

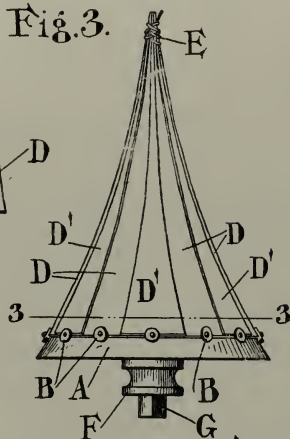


Fig. 5.

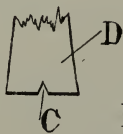


Fig. 2.

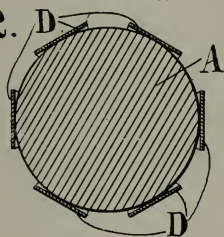


Fig. 4.

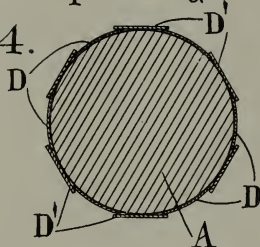
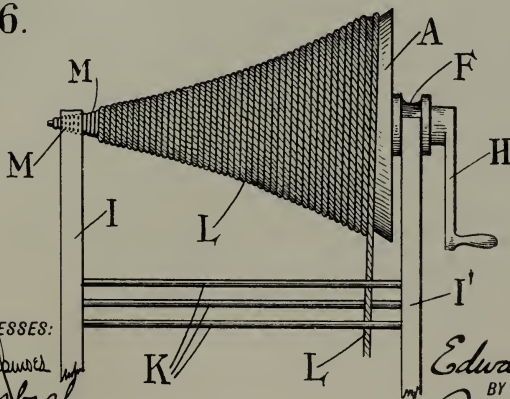


Fig. 6.



WITNESSES:

Lindley Schepers
F. M. Donbach

INVENTOR

Edward A. Schoettel
BY
Phillips Abbott
ATTORNEY

UNITED STATES PATENT OFFICE.

EDWARD A. SCHOETTEL, OF BROOKLYN, NEW YORK, ASSIGNOR TO
EMMA J. SCHOETTEL, OF BROOKLYN, NEW YORK.

PROCESS OF MANUFACTURING HORNS.

SPECIFICATION forming part of Letters Patent No. 769,410, dated September 6, 1904.

Application filed February 18, 1904. Serial No. 194,161. (No model.)

To all whom it may concern:

Be it known that I, EDWARD A. SCHOETTEL, a citizen of the United States, and a resident of the borough of Brooklyn, county of Kings, city and State of New York, have invented a new and useful Process or Method for the Manufacture of Megaphone and Similar Horns, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, in which—

Figure 1 illustrates an elevation of the former or block on which the horn is made, showing some of the pieces or gores of paper or similar material in position thereon which, with others, are to form the horn. Fig. 2 illustrates an end view of that which is shown in Fig. 1 on the line 1 1 of that view. Fig. 3 illustrates an elevation similar to that shown in Fig. 1, showing, however, all of the pieces or gores also of material which, with the others shown, are to form the horn, in place on the former, covering the spaces between the longer gores. Fig. 4 illustrates an end view of that which is shown in Fig. 3, taken on the line 3 3 of that figure. Fig. 5 illustrates a detail showing the notch in the lower end of the gores, whereby they are held in position on the former. Fig. 6 illustrates an elevation of the apparatus whereby the gores are all drawn forcibly down to position and held there until dried.

A represents the conical or tapering former or block upon which the horn is made up from a series of tapered or gore-shaped pieces D D' D' of paper or similar material. The former may be and usually is made of wood, although any other suitable material may be used. Its exterior shape determines the shape of the horn.

B B are a series of catches, which may be like very large headed nails, driven into or fastened to the former at stated intervals near its larger end, as shown, in such positions that a notch C (see Fig. 5) made in the lower edge of each of the gores will fit under the appropriate nail, and thereby that end of the gore will be held against lateral movement during the process of applying them upon the former.

The upper ends of the gores (see Figs. 1

and 2) are confined partly by glue or other adhesive material applied to them where they overlap and also by a cord E, which is tightly tied about their upper ends, where they are applied to the former.

F is a round bearing, preferably grooved, as shown, fastened centrally on the base of the former, and outside of the journal part is a squared projecting part G, adapted to receive a crank H. (See Fig. 6.)

I and I' are two vertical bars constituting a frame, which is suitably braced and provided with suitable tension devices, such as the cross-bars K K. At the upper end of the bar I there is an open-ended semicircular notch or journal, adapted to receive the small end of the former with the tied ends of the gores thereon, and on the upper end of the other bar, I', there is another open-ended journal, adapted to receive the bearing F.

L is a small rope, which may be about the size of an ordinary clothes-line or somewhat larger, if preferred, and it is of such length as to make successive coils, preferably touching each other, the whole length of the gores and preferably one or two additional coils. I prefer that at the smaller end of the horn a few feet of material, such as pigskin or belt lacing M, be substituted for the rope, but attached to it, because such material, being more pliant and self-adjusting than the rope, will more satisfactorily draw the small and relatively stiff edges of the narrower part of the gores into position than the rope will, and also some part of the pigskin lacing necessarily, or at least preferably, rests within the journal, being wound tightly thereon under the strain of the crank in such manner that the former revolves on it, and I have found that the pressure of this operation on the pliant lacing secures a better finish to the small end of the horn than if the rope were used and also that the lacing will not wear or fray out as much as the rope will.

The operation is as follows: After the gores have been applied to the former in the manner stated the former is lifted from its primary support and placed in the winding-frame. (Shown in Fig. 6.) Then the crank is applied

to the squared boss G, and the end of the lacing M is firmly attached to the small end of the former, preferably just at the ends of the gores or slightly beyond them. Then one operative forcibly turns the crank which another directs and applies tension upon the rope and lacing. In this way the strain may be uniform or varied, as circumstances require and as observed, during the winding operation to draw all the edges of the several gores from their angular position (shown in Figs. 2 and 4) into the requisite circular form to make a handsomely-finished and uniformly-shaped product. If the glue or other adhesive material has at all set or chilled before the forming pressure is applied to the gores, then I subject the same to a blast of steam, which will soften the adhesive material and render all parts pliant, so that they will readily respond to the pressure exerted by the lacing and rope, or by the rope alone if the lacing is not used.

Obviously lacing may be used throughout, if preferred, and any equivalent material other than the rope or lacing may be substituted therefor.

After the compression or forming of the gores has been finished by winding the rope or its equivalent on them, as shown, then the end of the rope is suitably fastened and the whole set aside to dry in its then condition. Meantime other horns may be made on other formers. When dry, the rope and lacing are unwound and removed, and then the edges of the gores are sandpapered down and the horn is finished in the usual way.

It will be obvious to those who are familiar with this art that many modifications may be made in the details of construction and operation of the parts. The former may be turned by machinery, and the flexible rope binder may be manipulated in a variety of ways, all, however, within the spirit and embodying the essentials of my process, which consists in the application upon the gores of the horn while they are held in position and while the adhesive material is yet soft of the pressure of a flexible binding device adapted to apply equal or varying pressures, as desired, upon each and every part of the gores, irrespective of the shape and size of the horn and of the material of which it is composed.

I claim—

1. The process described in the manufacture of horns, consisting in cutting the material of which the horn is to be made into gore-shaped pieces, detachably attaching said pieces to an interior former, whereby circumferential movement of one relative to the other is prevented, the edges of said pieces overlapping, applying adhesive material between the overlapping edges, revolving the interior former and the pieces with it while the adhesive material is still soft and subjecting the parts composing the horn to the continuous

and forcible pressure of a single flexible and elastic binding device which is wound upon them under tension as the former revolves.

2. The process described in the manufacture of horns, consisting in cutting the material of which the horn is to be made into gore-shaped pieces, detachably attaching said pieces to an interior former, whereby circumferential movement of one relative to the other is prevented, the edges of said pieces overlapping, applying adhesive material between the overlapping edges, revolving the interior former and the pieces with it while the adhesive material is still soft and subjecting the parts composing the horn to the continuous and forcible pressure of a single flexible and elastic binding device, which is wound upon them under tension as the former revolves, the winding of the binding device upon the gore-shaped pieces commencing at the small end of the horn and progressing toward the larger end thereof.

3. The process described in the manufacture of horns, consisting in cutting the material of which the horn is to be made into gore-shaped pieces, detachably attaching said pieces to an interior former, whereby circumferential movement of one relative to the other is prevented, the edges of said pieces overlapping, applying adhesive material between the overlapping edges and winding under tension continuously applied always in the same direction upon the parts composing the body of the horn, while they are supported in position upon the former, a flexible and elastic binding device, which is wound upon the said pieces commencing at the small end and extending toward the larger end, said binding device being provided with means whereby its tension may be varied at will.

4. The process described in the manufacture of horns, consisting in cutting the material of which the horn is to be made into gore-shaped pieces, detachably attaching said pieces to an interior former, whereby circumferential movement of one relative to the other is prevented, the edges of said pieces overlapping, softening adhesive material previously applied between the overlapping edges by the application of steam thereto, revolving the interior former and the pieces with it while the adhesive material is plastic and adhesive and subjecting the parts composing the horn to the continuous and forcible pressure of a single flexible and elastic binding device which is wound upon them under tension as the former revolves.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWARD A. SCHOETTEL.

Witnesses:

FLORA M. DONSACH,
ALFRED G. SCHOETTEL.

No. 770,024.

PATENTED SEPT. 13, 1904.

B. RUGGIERO & G. BONGIORNO.

HORN FOR PHONOGRAPHS OR SIMILAR MACHINES.

APPLICATION FILED JUNE 24, 1904.

NO MODEL.

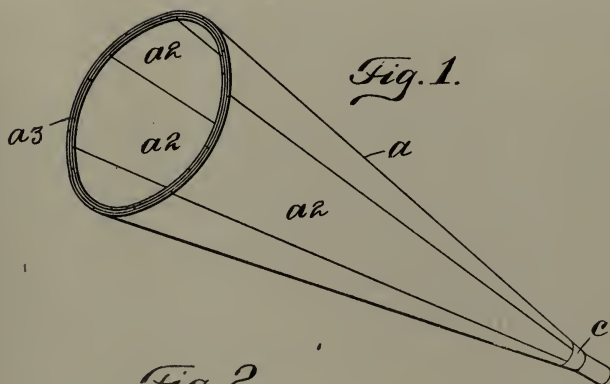


Fig. 2.

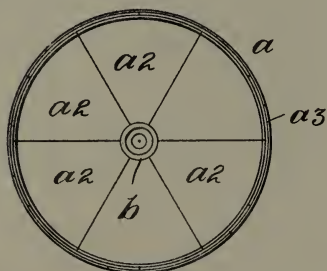
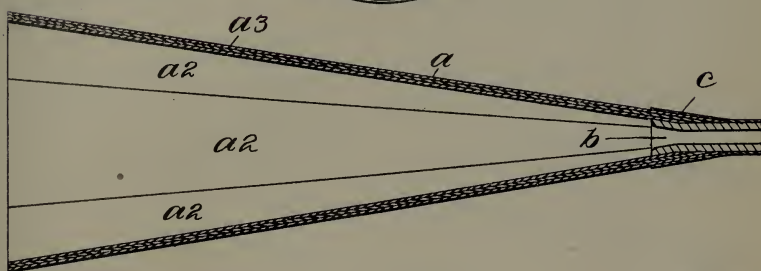


Fig. 3.



WITNESSES

A. J. Mattingly
C. E. Mulhearn

INVENTORS

Bartolo Ruggiero
Gaetano Bongiorno

BY

Edgar Tatel & Co.

ATTORNEYS

UNITED STATES PATENT OFFICE.

BARTOLO RUGGIERO AND GAETANO BONGIORNO, OF BROOKLYN,
NEW YORK.

HORN FOR PHONOGRAPHS OR SIMILAR MACHINES.

SPECIFICATION forming part of Letters Patent No. 770,024, dated September 13, 1904.

Application filed June 24, 1904. Serial No. 213,916. (No model.)

To all whom it may concern:

Be it known that we, BARTOLO RUGGIERO, a citizen of the United States, and GAETANO BONGIORNO, a subject of the King of Italy, both residing in Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Horns for Phonographic or Similar Machines, of which the following is a specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to horns for phonographic and similar machines; and the object thereof is to provide a horn for machines of this class which will do away with the mechanical, vibratory, and metallic sound usually produced in the operation of such machines and also produce a full, even, and continuous volume of sound, in which the articulation will be clear, full, and distinct.

The invention is fully disclosed in the following specification, of which the accompanying drawings form a part, in which the separate parts of our improvement are designated by suitable reference characters in each of the views, and in which—

Figure 1 is a perspective view of our improved phonographic horn; Fig. 2, an end view thereof, and Fig. 3 a longitudinal section.

In the practice of our invention we provide a horn *a*, composed of separate layers of longitudinally-arranged strips *a*¹, said strips being preferably composed of wood or similar fibrous material. In the construction shown three of the separate layers are employed, as shown at *a*¹, and each of said layers is composed of six of the separate and longitudinally-arranged strips *a*². The separate layers *a*¹, which make up the horn *a*, may be secured together at the edges by glue or in any suitable way, and in practice said layers are preferably formed separately and inserted into each other, or the outer layer is first formed and the second and third layers inserted thereinto, and in this operation the outer surface of the second and third layers are covered with any suitable glue or adhesive material, and the

separate parts or layers of the horn are thus securely held together and make up, in effect, a single homogeneous construction. Instead of forming the separate layers separately and inserting one within another, as hereinbefore described, the inner layer may first be formed and the separate longitudinal strips of the second layer secured thereon, after which the separate longitudinal strips of the outer layer may be secured in position, and in either event the separate layers are so connected as to break the joints thereof, as clearly shown in Figs. 1 and 2.

In the smaller end of the horn *a* is secured a short tube *b*, which is larger at its outer than its inner end, and this tube is also composed of wood or similar fibrous material and is intended to strengthen the smaller end of the horn, and in practice I secure on the smaller end of the horn a sleeve *c*, which is preferably composed of metal and which is also intended to give strength to the smaller end of the horn and facilitate the attachment of the horn to the machine without injury to the smaller end of the horn.

It will be understood that the general form of the horn may be the same as other devices of this class, and the larger end thereof may be bell-shaped, if desired, and the connections of the horn with the machine is made in the usual manner.

By means of our improvement we provide a horn for the purpose specified which will produce a constant and continuous volume of sound, in which the articulation will be clear, full, and distinct and which will not produce the mechanical, vibratory, and metallic sound usually produced by instruments of this class as heretofore constructed.

Our invention is not limited to the exact form of the horn, nor to the number of the separate layers of material employed in the construction thereof, nor to the number of longitudinal strips in each layer, and various changes in and modifications of the construction herein described may be made without departing from the spirit of our invention or sacrificing its advantages.

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

5 1. A horn for phonographic and similar machines, composed of separate layers of fibrous material, each of said layers being composed of separate longitudinal strips arranged so as to break joints, substantially as shown and described.

10 2. A horn for phonographic and similar machines, composed of separate layers of fibrous material, each of said layers being composed of separate longitudinal strips arranged so as

to break joints, and the smaller end of the horn being provided with a tube of fibrous material which is secured therein, substantially as shown and described. 15

In testimony that we claim the foregoing as our invention we have signed our names, in presence of the subscribing witnesses, this 22d 20 day of June, 1904.

BARTOLO RUGGIERO.
GAETANO BONGIORNO.

Witnesses:

C. J. KLEIN,
C. E. MULREANY.

[Second Edition.]

N^o 22,612

A.D. 1899

(Under International Convention.)

Date claimed for Patent under Sect. 103 of Act,
being date of first Foreign Application (in } 15th Apr., 1899
United States),

Date of Application (in the United Kingdom), 13th Nov., 1899

Complete Specification Left, 13th Nov., 1899—Accepted, 17th Feb., 1900

COMPLETE SPECIFICATION.

Improvements in Graphophones.

I, GEORGE L. HOGAN, of 109, Equitable Building, Baltimore, in the State of Maryland, United States of America, Gentleman, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

- 5 My invention relates to improvements in graphophones or devices designed for reproducing articulate speech or other sounds recorded on phonograms or sound-writings.

- The object of my invention is to provide a device or mechanism of a simple, cheap, and durable construction by means of which such phonograms or sound-writings may be accurately and perfectly audibly produced without any attendant disagreeable scraping, grating, or other interfering noise resulting from the action of the mechanism.

- My invention consists of a sound-generator in the form of a trumpet of conical shape made of a tough quality of paper, vulcanized fibre, or other material and having a rigidly attached small rod of hard material, the extremity of which is brought to a fine point and bent so as to fit in the spiral grooves of the phonogram-writing and pivoting said trumpet.

- The invention is illustrated in the accompanying drawings, in which—

- Figure 1 is a sectional view of a portion of the base on which the cylinder is mounted.

Figure 2 is a top view of the machine complete.

Figure 3 is a sectional view of the point end of the trumpet on a somewhat larger scale.

Figure 4 is a side elevation of the complete machine.

- Figure 5 is a detail view of part of the trumpet, showing the manner of joining its edges.

Figure 6 is a detail view of the adjustable cushion.

- The large end of the trumpet A rests on a stud b, where it is pivoted loosely on a vertical rod c, extending from the stud upward. This gives the point end of the trumpet a free lateral swinging movement. The trumpet has on its lower side a hole c¹ and on its upper side a slot c², through which the rod passes. The longitudinal slot c² affords a slight range of up- and down movement to the point end. A hard downward-curved point d is attached to the small end of

[Price 8d.]

Hogan's Improvements in Graphophones.

the trumpet, and said point rests on the phonogram-cylinder, and as the same is revolved the spiral groove of the writing serves as the means to carry the point *d* from one end to the other of the cylinder, the trumpet swinging on its pivot *c*. No other feeding or guiding device is required.

The hard point *d* may be attached to any portion of the wall of the sounding-trumpet and yield good results. I have, however, provided a novel means of attachment that will now be described. The hard point *d* is preferably held in a socket *e*, from which it may be removed when desired. The socket is fixed on the end of a rod *f* and has position in front of the point end *g* of the trumpet. This rod extends along below the small end of the trumpet, and its end *f*¹ is attached to the side of the trumpet some distance back from the said point end. This manner of locating the hard point *d* and connecting it with the side wall of the trumpet, but back from its point end *g*, produces the best results.

The trumpet is made of a sheet of tough paper or thin indurated fibre, and each of the two edges of this material that come together when the sheet is folded to the cone form are first bordered by a thin sheet-metal strip folded longitudinally, as shown at *h* in Figure 5. This metal strip encloses the sheet edge like a clip and extends from the large end to the point end. The two metal strips are abutted together and joined by solder. This metal strip not only serves as a means of joining the sheet edges, but also serves to augment and improve the sounding qualities of the trumpet.

It is a feature of improvement in this invention to attach the end *f*¹ of the rod to which the hard point is secured to the said metal joint-strips *h*. Thereby the metal strips become the conductor for the sound vibrations, which latter are evenly distributed all along the wall of the trumpet. The pivot-hole *c*¹, heretofore referred to is through this metal strip.

The phonogram-cylinder *I* is held in position by two bearings *j* *j*¹ and a horizontal axis *k*. The bearings are slotted out instead of being bored, so that the phonogram-cylinder can easily be lifted out of these bearings. The slots *l* *l*¹ in the two bearings are cut at right angles to one another and are in such a position that the force of elasticity of an india-rubber belt *m*, connecting the pulley *n*, attached to the phonogram-cylinder, with the pulley *o* of the driving device, will keep the axis of the phonogram-cylinder always pressed firmly in the bearings, and thus produce a steady movement. By this simple means I have found that articulate speech, songs, and instrumental or other music may be reproduced from sound-writing very accurately, and with great loudness, clearness and distinctness.

It will be seen that this graphophone has a cylinder that may be rotated by any driving mechanism and a sounding-trumpet whose point end is movable along the cylinder, following the sound-writing. The point end automatically follows the spiral groove of the sound-writing, and the vibrations are transmitted to the trumpet, which generates and largely increases the volume of sound.

As the hard point *d* is held in a socket, it may be removed when worn and a new one inserted.

An adjustable cushion *p* is shown in Figures 3 and 6, as a ring, and is mounted on the rod and may be shifted along said rod. This cushion bears on the wall of the trumpet, and its varying position alters the tone or pitch of the sound.

A cylinder is shown carrying the sound-writing; but it is obvious a disc may be used instead or any shaped body to rotate.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A graphophone having in combination a rotating sound-writing; a vibratory

Hogan's Improvements in Graphophones.

- cone-shaped sounding-trumpet pivoted to allow its point end a free swinging movement, and also a slight vertical movement; a hard point engaging the surface of the said sound-writing in front of and in-line with the point end of the trumpet but not contacting therewith and supported by a rod which
 5 extends along the outer wall of the trumpet and attached to the side thereof.
2. A sounding-trumpet for graphophones comprising a sheet of fibre folded to form a cone and the edges which come together bordered by strips of metal folded over the edges and the said metal strips united, and a hard point at the point end of the trumpet.
- 10 3. A sounding-trumpet for graphophones having a cone shape and made of fibre; a strip of thin metal extending longitudinally of said cone and secured to the trumpet; a hard point in front of the trumpet's point end but not attached thereto; and a rod supporting the said hard point and extending along the outside of the trumpet and attached to said metal strip.
- 15 4. A graphophone having a base provided with two bearings each having a slot inclining in a different direction from the other; a rotary cylinder carrying the sound-writing and having journals resting in said slotted bearings; a pulley on one journal; a drive-pulley; and a belt from the drive-pulley to the cylinder-pulley, as and for the purpose set forth.

20 Dated this 11th day of November 1899.

W. P. THOMPSON & Co.,
 Of 6, Lord Street, Liverpool, Agents for the Applicant.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.

[Wt. 39—25/11/1909.]

A.D. 1899. Nov. 13. N^o. 22,612.
HOGAN'S COMPLETE SPECIFICATION.

(1 SHEET)

(2nd Edition)

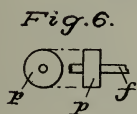
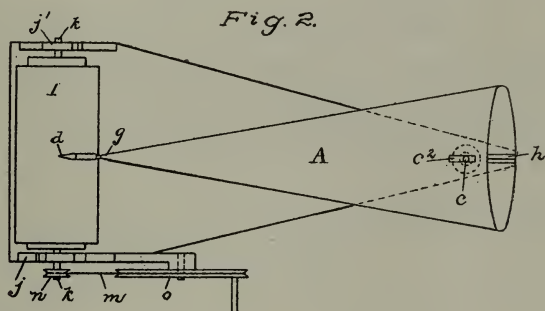
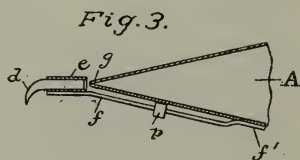
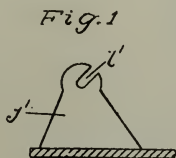


Fig. 4.

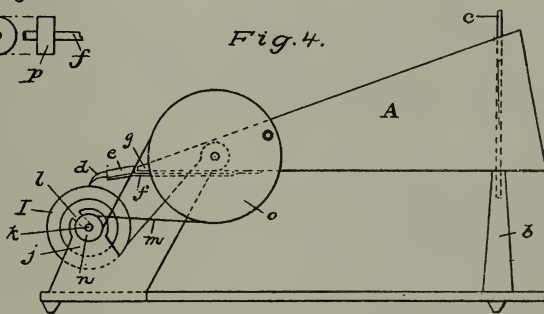
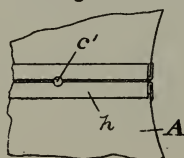


Fig. 5.



[This Drawing is a reproduction of the Original on a reduced scale.]

[Second Edition.]

N^o 7594

A.D. 1900

Date of Application, 24th Apr., 1900—Accepted, 23rd June, 1900

COMPLETE SPECIFICATION.

Improvements in Graphophones or Phonographs.

A communication by **GEORGE L. HOGAN**, of the City of Baltimore, State of Maryland, United States of America, Electrical Engineer.

I, **WILLIAM PHILLIPS THOMPSON**, F.C.S., M.I.M.E., Agent for Foreign Patent Solicitors, 6, Lord Street, Liverpool, and 6, Bank Street, Manchester, both in the County of Lancaster, 118, New Street, Birmingham, in the County of Warwick, & 322, High Holborn, in the County of Middlesex, Civil Engineer, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This present invention pertains to improvements in graphophones or phonographs, the construction and advantages of which will be hereinafter set forth, reference being had to the annexed drawings, wherein—

Fig. 1 is a side elevation of the machine as a whole;

Fig. 2, a top plan view;

Fig. 3, a perspective view of a portion of the trumpet and the reproducing point or stylus;

Fig. 4, a perspective view of the trumpet and its supporting arm;

Fig. 5, a transverse sectional view of a portion of the trumpet, showing the means employed for connecting its edges;

Fig. 6, a similar view illustrating a modified form thereof;

Fig. 7, a side elevation, partly in section, of a modified form of trumpet, and

Fig. 8, a side elevation of a record-supporting spool or holder, with the sound record shown in section thereon.

The main object of this invention is to produce a simple, cheap, and yet highly efficient phonograph.

With the construction hereinafter described, many advantages present themselves, more particularly in the method employed for imparting motion by hand to the sound record, whereby an even application of power is obtained; and again, in the manner in which the trumpet is secured together, and further, in the means employed for supporting the trumpet, all of which will be set forth in detail.

Other objects and advantages will appear in the following description.

Referring first to Figs. 1 and 2, A denotes the base or main frame of the instrument, supported upon two fixed legs B, B, and an adjusting screw C by means of which the base may be brought to its proper level position.

Rising from the base, preferably at one side thereof, is an upright arm or member D in the rear upper portion of which there is formed an upwardly and rearwardly extending slot E, while a similar slot is formed in a corresponding arm upon the opposite side of the base. These slots constitute the supports or bearings for the ends of the axle F of the record spool G. The axle may be formed in one piece and extend from end to end of the spool, or it may comprise simply two short pins secured in the ends of the spool.

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As will be noted upon reference to Figures 2 and 8, the spool or support G is provided at one end with a pulley H.

Mounted and fixed upon a suitable axle journaled in the forward portion of the upright wall or member D, is a band pulley I, while connected to the outer end of said axle is a crank I¹ for imparting motion thereto. A second axle is secured in the upright member D, and upon this is loosely mounted a small pulley J, having formed integral therewith or connected thereto a fly-wheel K.

Suitable elastic bands L, such for instance as rubber, connect the pulleys I and J, and pulley J with the pulley H of the record spool or support.

Where power is applied to the crank by hand, it is next to impossible to turn the same with that evenness which is necessary to the best results in a phonograph,—especially so where a musical record is being used. By reason of the yielding of the elastic bands, which work in conjunction with the fly-wheel, the motion which is imparted to the record support or spool is quite even. In other words, should the operator give a sudden jerky motion to the crank, it will not be imparted to the record, but will be taken up and absorbed in a great measure by the yielding of the band or bands. By the use of elastic bands, the record or record support may be easily withdrawn from its bearings, and a new one introduced. The elastic band, working on the record support, serves to hold said support to its proper place relative to the bearings or slots E.

For the sake of lightness and appearance, the central portion of the base is cut away or left open in the process of manufacture; and extending forwardly from this open portion is a slot M, preferably closed at its forward end.

N denotes the trumpet support, which is preferably of the form illustrated in Figures 1 and 4; that is to say, comprises a long, tapering arm carrying at its forward end an upwardly extending point or finger O. The opposite end of the support extends down and is broadened out somewhat, presenting a flat bearing surface which rests upon the base at each side of the slot when the parts are assembled.

To maintain the parts in place, the support is provided with a downwardly extending T-shaped member P, the body of which passes through the slot, while the laterally extending arms engage the under face of the base,—see Fig. 1. To prevent any lateral or sidewise movement of the support, a downwardly extending stud or lug Q is also provided, which projects into the slot, as indicated in dotted lines in Figure 1. From this it will be seen that the support is firmly held in its proper relation to the base, that it may be adjusted back and forth in the slot, and may be readily detached and removed from the base when it is desired so to do.

R denotes the trumpet, the body of which is made of relatively thin, tough paper, papier-mâché, indurated fibre, isinglass, gelatin, or preferably, celluloid, formed of a single piece and having its edges joined together by a strip of sheet-metal in the manner illustrated in Fig. 5, or that shown in Fig. 6. In place of the sheet-metal binding strip a strip of celluloid, formed so as to embrace the adjacent edges of the sheet may be used, in which case the binding strip and the edges of the sheet will be held together by celluloid glue, or some similar material.

In Fig. 5 it will be seen that the edges of the trumpet overlap one another and are embraced between the folds of the reversely turned edges of a sheet-metal strip or a strip of celluloid, said strip extending from end to end of the trumpet, as is clearly indicated in Figs. 1 and 4.

In Fig. 6 two pockets are formed in the binding strip by bending it as shown, that is to say, by first bending the edges of the strip toward the centre of the body, and then outwardly again upon the intumed portion, the edges of the trumpet body being inserted into the spaces or pockets thus formed.

With both forms of connecting device, when the parts are assembled, a suitable cement is employed to ensure close contact and firm adhesion,—in the case of the metal strips, said strips and the edges of the trumpet are of course squeezed

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together or otherwise brought into close and intimate contact, so that there can be no independent vibration of the parts one relatively to the other.

Celluloid is perhaps the best material which can be employed in the construction of a trumpet, particularly for the class of machines similar to that herein shown and described. It is light, and when built up in the manner described, is highly resonant, is durable, cheap, and also possesses many other advantages which are apparent to any one familiar with this art.

While the trumpet has been shown in connection with a particular form of phonograph, still it is apparent that it may be used with any type of machine to great advantage.

Soldered or otherwise secured to the forward end of the binding strip S is an arm T, the main body of which stands at a slight distance from and parallel to said binding strip. It is provided throughout its length with interned or locking edges U adapted and designed to engage with similar outwardly turned edges of a U-shaped member V. In the lower side of said member V there is formed an opening W through which the finger O of the supporting arm extends, the upper pointed end of said arm bearing against the under face of the arm T, as indicated in Fig. 1. The opening W is of such size as not to bind upon the arm or finger O, but to permit a slight free movement of the parts.

At or near the rear end of the binding strip S, there is secured by solder or otherwise, a holding and clamping device for the point or stylus X of the graphophone. Said clamping device comprises two spring arms Y and Z, the arm Y being nearest to the strip, while the arm Z which is somewhat longer, stands in a plane below the arm Y and has secured to it a rounded support or seat *a*.

The reproducing point or stylus X, in the form shown, comprises a short section of glass tubing or rod, having one end closed, if a tube, and drawn down to a point to form the working point, while the body thereof surrounds the arm Y and rests upon the support *a*, as is most clearly shown in Fig. 3.

Interposed between the binding strip S and the upper face of the body of the stylus or reproducing point, is a cushion *b*, preferably formed of leather or a somewhat similar yielding substance.

From the foregoing it will be seen that the stylus may be moved back and forth upon its support, so that its point may be projected beyond the end of the trumpet, as indicated in Figs. 3 and 4, or may be directly below the trumpet as indicated in Figs. 1 and 2.

The record support (shown in Fig. 8) is cut away throughout the major portion of its length to render it light in weight, while at the same time it affords a sufficient bearing at each end for the record or cylinder employed.

In Fig. 7 a modified form of the trumpet is shown, which, instead of being a true cone or a frustum of a cone, consists of a main portion *c*, which may be a true cone or a frustum of a cone having connected to it two or more sections *d e* each of which is a frustum of a cone made upon a different angle from each other and from the main body so as to produce a flaring-shaped trumpet. The various sections of the trumpet will be made of the material before mentioned, and will be connected throughout their length by fastenings similar to those shown in Figs. 5 and 6. The adjacent or abutting ends of the various sections will have secured upon them metal strips or bands *f*, which will embrace the ends and which strips in turn will be soldered or brazed to each other entirely around the trumpet. The outer end of the trumpet will also preferably be provided with a sheet-metal strip or ring securely held thereon by some cementitious substance and pressure, as above described in connection with the binding strip S.

While my correspondent has shown and described this modified form of trumpet as being made up of a series of cone frusta, it is of course possible to make it up of a series of pyramid frusta, though, from many points of view, the conical form is preferable.

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From the foregoing description it will be seen that when the parts are assembled, the trumpet will swing upon the finger O and that the stylus or point X will follow the sound writings upon the cylinder or other sound record being used. By reason of the adjustability of the arm or trumpet support N the stylus or point can be brought to its proper position relative to the cylinder so that the best results may be obtained. It will be noted that the supporting member V is also adjustable with relation to the arm U, and that a certain degree of elasticity is present in said arm U. By these adjustments the proper degree of pressure necessary to be had upon the reproducing point is secured, and the parts may be adjusted with a nicety which is requisite to the best results.

A variation in the character of the sound reproduced may also be obtained by adjusting the stylus back and forth with relation to the trumpet.

While my correspondent has shown an apparatus designed to be driven by hand, it is manifest that instead of the mechanism illustrated, a spring or other motor may be employed for imparting the necessary rotation to the spool G which supports the record.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, as communicated to me by my foreign correspondent, I declare that what I claim is:—

1. In a phonograph, the combination of a suitable base; arms extending upwardly therefrom; a rearwardly extending slot formed in each of said arms; a record support provided with axles extending from its ends and adapted to rest in said slots; and means for imparting motion to said support.

2. In a phonograph, the combination of a suitable base; arms extending up therefrom; a rearwardly extending slot formed in each of said arms; a record support journaled in said slots; a driving pulley; and elastic connections intermediate said pulley and the support for imparting motion to the latter, substantially as described.

3. In a phonograph, the combination of a suitable base; a record support journaled thereon; a power pulley; and elastic connections intermediate said pulley and the record support for imparting motion to the latter, substantially as and for the purpose described.

4. In a phonograph, the combination of a suitable base; a record support journaled thereon; a power pulley; a fly-wheel; and elastic connections intermediate the record support, the fly-wheel, and the power pulley, substantially as and for the purpose described.

5. In a phonograph, the combination of a suitable base; means for holding a sound record rotatably thereon; a source of power; a fly-wheel; and elastic driving bands connecting the record-holding means and the fly-wheel, and said fly-wheel and the source of power.

6. In a phonograph, the combination of a suitable base; arms or supports extending up therefrom, each provided with an upwardly and rearwardly inclined slot; a record support having its bearings resting in said slots; a power pulley I; a pulley J located intermediate said pulley I and the record support; a fly-wheel working with said pulley J; and elastic bands L connecting the power pulley I and the record support with pulley J.

7. In a phonograph, the combination of a suitable base; a record support carried thereby; a trumpet; and an adjustable support for the trumpet mounted upon the base.

8. In a phonograph, the combination of a suitable base; a record support carried thereby; a trumpet; and a yielding support for the trumpet, substantially as described.

9. In a phonograph, the combination of a suitable base; a record support carried thereby; a trumpet; and an adjustable and yielding support for the trumpet, substantially as described.

10. In a phonograph, the combination of a suitable base; a record support

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carried thereby; a trumpet; an adjustable support for the trumpet mounted on the base; and means for adjusting the level of the base.

11. In a phonograph, the combination of a suitable base; a record support carried thereby; a trumpet, an adjustable and yielding support for the trumpet; and means for adjusting the level of the base.

12. In a phonograph, the combination of a suitable base; a record support carried thereby; a trumpet pivotally supported at its outer end and having its inner end above the record support; and means for adjusting the level of the base; substantially as and for the purpose described.

13. In a phonograph, the combination of a suitable base; a record support carried thereby; a trumpet; and means carried by the base for adjusting the trumpet toward and from said support, substantially as described.

14. In a phonograph, the combination of a suitable base; a record support; a trumpet; an arm adjustably connected to the forward end of said base and extending out therefrom; and pivotal connections intermediate said arm and the trumpet, whereby the rear end of the trumpet may be adjusted with relation to the record, and is free to move both laterally and vertically, substantially as described.

15. In a phonograph, the combination of a suitable base; a record support; a trumpet; an arm adjustably connected to the forward end of said base and extending out therefrom; a finger extending up from said arm; and connections, substantially as described, between said finger and the trumpet.

16. In a phonograph, the combination of a suitable base; a record support carried thereby; a slot formed in the forward portion of the base; an arm N provided with means working in conjunction with the slot for adjustably attaching said arm to the base; a finger O extending up from the forward end of arm N; a trumpet; an arm U connected to the underside of the trumpet; and a member V connected to said arm and provided with an opening through which the finger O extends.

17. In combination with a phonographic trumpet, a point or stylus connected thereto, said stylus comprising a section of glass tubing or rod drawn to a point at one end.

18. In combination with a phonographic trumpet, a reproducing point or stylus, said stylus comprising a section of glass tubing or rod drawn to a point at one end; means for holding the stylus in close contact with the trumpet; and a cushion interposed between the stylus and the trumpet.

19. In combination with a phonographic trumpet, a reproducing point or stylus, comprising a section of glass tubing or rod drawn to a point at one end; a support for said stylus, consisting of two arms Y and Z attached to the trumpet; and a cushion intermediate the tube and trumpet, substantially as described.

20. In combination with a phonographic trumpet, a reproducing point or stylus, comprising a section of glass tubing or rod drawn to a point at one end; a support for said stylus, comprising two arms Y and Z; a bearing *a* attached to said arm Z; and a cushion interposed between said stylus and the trumpet.

21. In combination with a phonographic trumpet, a reproducing point or stylus, comprising a section of glass tubing or rod drawn to a point at one end; and means for adjustably connecting the stylus to the trumpet, substantially as described.

22. A trumpet for phonographs, composed of a single sheet of resonant material having its edges clamped and held together by a single strip of metal or the like, substantially as described.

23. A trumpet for phonographs, composed of a single sheet of resonant material bent to form, and having its edges treated with a cementitious substance and held together by a single strip of metal or the like bent around them, substantially as described.

24. A trumpet for phonographs, comprising a single sheet of resonant

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material bent to form; and a strip of metal shaped to form pockets adapted and designed to receive and hold the proximate edges of the sheet, substantially as described.

25. A trumpet for phonographs, comprising a main body portion composed of a single sheet of resonant material bent to form, and having its proximate edges secured together; and an additional flaring section secured to the outer end of the main body, said flaring section being likewise formed of a single sheet of resonant material having its proximate edges secured together, substantially as described.

26. A trumpet for phonographs, comprising a main body portion and a series of connected sections attached to the large end of the body portion, each succeeding section having its walls more flaring than those of the preceding one, substantially as described.

27. A trumpet for phonographs, comprising a main body portion and a series of connected sections attached to the large end thereof, each succeeding section having its walls more flaring than those of the preceding, and the main body and each of the sections being each formed from a single sheet of fibre having its proximate edges secured together by a strip of metal or the like, substantially as described.

28. A trumpet for phonographs, comprising a main body portion conical in form and composed of a single sheet of resonant material having its proximate edges secured together by a strip of metal or the like; and a series of connected sections attached to the large end of the main body, each succeeding section being in outline a frustum of a cone, having a larger base than the preceding and each formed of a single sheet of resonant material having its proximate edges connected by a metal strip or the like, substantially as described.

29. A supporting spool for phonographic sound records having its central portion cut away or reduced in diameter, and having a pulley formed at one end thereof, substantially as described.

30. A trumpet for phonographs or the like, composed of celluloid or its described equivalent.

31. A trumpet for phonographs composed of a sheet of celluloid bent to form and having its proximate edges secured together in a manner substantially as herein set forth.

Dated this 23rd day of April 1900.

WM. P. THOMPSON & Co.,
Agents.

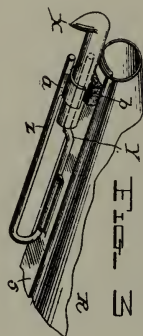
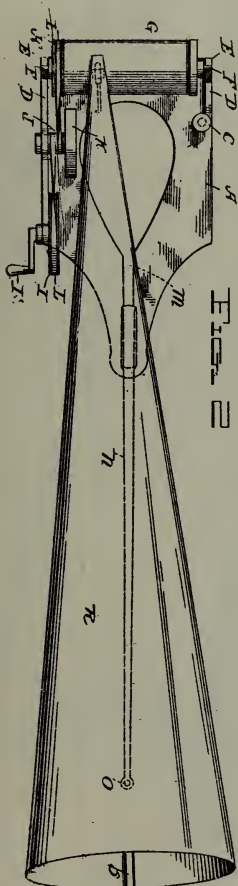
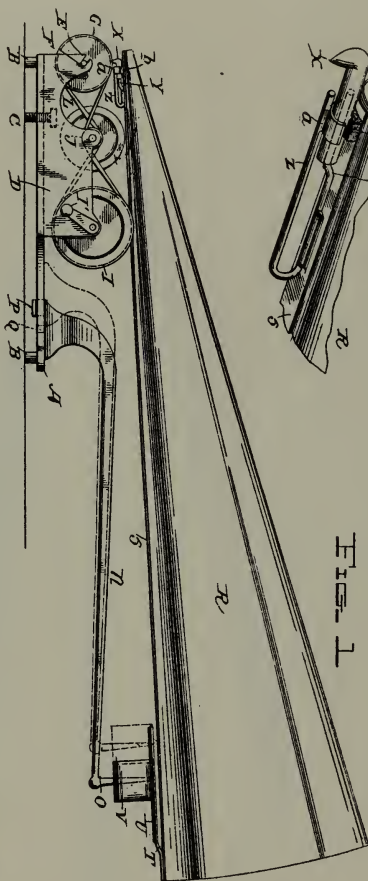
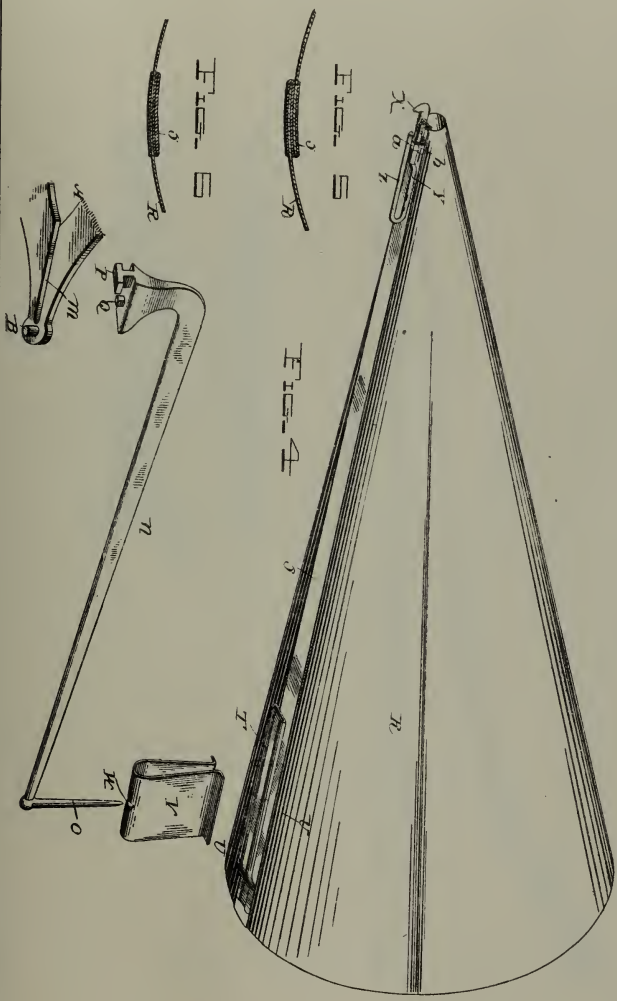


FIG. 1

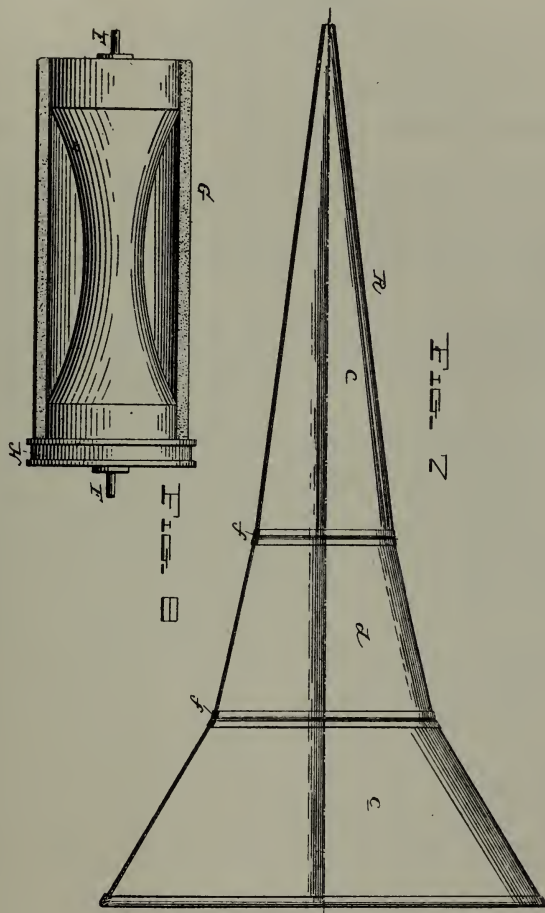


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A.D. 1900. APRIL 24. N^o 7594.
 THOMPSON'S COMPLETE SPECIFICATION.
 (2nd Edition)

(3 SHEETS
 SHEET 8)



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[Second Edition.]

N^o 9727

A.D. 1901

Date of Application, 10th May, 1901

Complete Specification Left, 5th Oct., 1901—Accepted, 7th Dec., 1901

PROVISIONAL SPECIFICATION.

"Improvements in or relating to Graphophones, Phonographs and the like"

I, WALTER C. RUNGE, Engineer of 49 Queen, Victoria Street, in the County of London, do hereby declare the nature of this invention to be as follows:—

This invention relates to graphophones, phonographs and other like instruments for reproducing sounds from records, its object being the construction of an instrument which, while thoroughly efficient in operation, is simple and cheap to manufacture.

The improvements are primarily applicable to instruments which are not provided with a diaphragm at the small end of the trumpet, but have a stylus of hard material attached to some part of the trumpet, the point of this stylus following the channels of the record in the well-known way. It is, however, to be understood that the improvements are not necessarily restricted to this particular type of instrument.

One construction of graphophone or phonograph according to this invention comprises a motor, which may, for example, be in the form of a train of wheels driven from a spring, this motor driving a mandrel adapted to receive a cylindrical record and also causing the rotation of a fine pitched screw, the axis of which is approximately parallel with that of the mandrel.

Held in suitable standards upon the base, which is preferably made heavy say by forming it of cast metal, is a guide-rod having free to slide and turn upon it a carrier. This carrier normally lies over the fine-threaded screw and is formed with a knife edge which engages with the thread. At the end of the carrier adjacent to the record mandrel is a fork, which may conveniently consist of two wire arms covered with some soft or yielding material, such for example as rubber tubing.

Upon the base of the instrument is a socket having a vertical hole which accommodates the end of a rod, serving as the support upon which the larger end of the sound trumpet is pivotted. This socket is provided with one or more slots with which engage pins upon the supporting rod, the object of this being to ensure that the pivot about which the trumpet turns shall be truly centred with regard to the record cylinder.

The sound trumpet may be made of any suitable material, celluloid being found very convenient for the purpose. When sheet material such as celluloid is employed the trumpet is joined down one side by metal strips or grips which may be joined say by soldering. To this strip is attached inside the larger end of the trumpet a small clip forming a slide, into which the edges of a U-shaped piece of metal are inserted. A hole is made through this clip and through the hole passes the pointed end of the trumpet support, its extreme point bearing against the inside of the U-shaped piece of metal and forming a pivot about which the trumpet may turn. The U-shaped piece is preferably formed so that the portion which rests on the pivot is approximately horizontal, thus obviating the danger of any binding action taking place.

In another construction of trumpet the pointed end of the support enters a hole made to receive it in a stem or rod which is pivotally attached to the trumpet.

Near the smaller end of the trumpet a socket is provided to accommodate the

[Price 8d.]

Improvements in or relating to Graphophones, Phonographs and the like.

stylus which may be of any hard material, say for instance glass rod or tubing. This socket may conveniently be attached to the metal strip which extends along the cone, and may be formed of spring metal and provided with a screw or other clamping device so that the stylus may be securely gripped. Preferably the ends of the socket are turned inwards so that the stylus is gripped by each end of the socket, the clamping screw being in the middle. 5

In operation the larger end of the trumpet is pivotted as above described on its supporting rod, the smaller end passes between the arms of the fork on the pivotted carrier, and the point of the stylus rests upon the cylinder.

In order that the point of the stylus may be withdrawn from contact with the record cylinder or any adjacent part of the mechanism when the instrument is not in use, a small safety catch or bracket is provided which may be secured to part of the framework. By slightly lifting the pivotted carrier, the latter may be caused to engage with the catch and the stylus is then placed out of contact with any part of the mechanism. 10 15

A cheap and effective mandrel for cylindrical records may be formed of a piece of light tubing, the diameter of which corresponds to that of the smaller end of the coned interior of the record, the larger end of the record fitting over a ring of larger diameter than the tube. This ring may conveniently form part of a pulley by which the mandrel is driven. 20

When a clock-work motor is employed, instead of having the usual winding key which is screwed on to its stem, the stem may be provided with projecting pins and the crank or key formed with a socket which slips over the stem and slots which accommodate the cross pins. These slots may be oblique and formed in such a direction that a slight turn of the handle brings it into connection with the pins so that the stem may be turned and a corresponding turn in the other direction disengages the handle from the stem. 25

In order that the motor may run with a minimum amount of noise it is preferred to make one or more of the gear wheels of vulcanized fibre or some other suitable non-metallic material. 30

Although in the above description a cylindrical record is mentioned it will be understood that the various improvements may be adapted to instruments having records of other form such for example as discs. Again the instruments may be adapted for hand or foot driving, or may be operated by means of an electric motor. 35

When the trumpets are made with detachable flared mouth-pieces, it is preferred to secure the mouth-piece to the main portion of the trumpet by means of screw clamps or the like. Two clamps may be provided at opposite sides of the trumpet which when tightened up grip the rim of the flared portion. 40

Dated this 10th day, of May, 1901.

WALTER C. RUNGE,
Boult, Wade & Kilburn,
Agents for the Applicant.

COMPLETE SPECIFICATION.

"Improvements in or relating to Graphophones, Phonographs and the like". 45

I, WALTER C. RUNGE, Engineer of 49 Queen Victoria Street, in the County of London, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:— 50

This invention relates to graphophones, phonographs and other like instruments for reproducing sounds from records, its object being the construction of

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an instrument which while thoroughly efficient in operation is simple and cheap to manufacture.

The improvements are primarily applicable to instruments which are not provided with a diaphragm at the small end of the trumpet, but have a stylus of hardened material attached to some part of the trumpet, the point of this stylus following the channels or grooves of the record in the wellknown way. It is, however, to be understood that the improvements are not necessarily restricted to this particular type of instrument.

In the accompanying drawings

10 Figure 1 is a perspective view of one construction of graphophone embodying the improvements according to this invention;

Figures 2 and 3 are detailed views showing portions of the instrument separately; and

15 Figures 4 and 5 are perspective views showing alternative constructions of another portion of the instrument.

Like letters indicate like parts throughout the drawings.

With reference first to Figure 1 A is a base plate preferably of cast metal of considerable thickness, so that it may be heavy and rigid. Upon this base is fixed a motor comprising in the example illustrated a train of wheels B mounted
20 between two plates B¹, one member B² of the train being preferably of hard fibre or other non-metallic material. From this motor a record carrying mandrel C is driven by means of a belt D and a pulley C¹. The train of wheels forming the motor is driven from a spring coiled in a barrel B³ and wound up when necessary and the rate of rotation of the record mandrel C may be regulated by
25 a lever E controlled by a screwed rod or other mechanism not shown in the drawings. One end of this lever E is furnished with a brake block E¹ say of leather, which presses against a disc F¹ connected to governors F, the action of the governors being to draw the disc F¹ away from the plate B¹ along a rod F² supported between that plate and a standard F³ secured to the base A. A lever G is provided by means of which the motor may be started and stopped.

Mounted free to turn between the outer plate B¹ and a standard H is a fine threaded screw J provided with a pinion J¹ which is driven from one of the wheels B. Parallel to this screw J and also held between the plate B¹ and the standard H is a rod K which forms a guide upon which a sleeve K¹ can travel
35 and turn. This sleeve K¹ forms part of a pivoted carrier comprising also a lever K², a head K³ and a fork K⁴, the arms of the latter being covered with rubber tubing or other soft or yielding material. Normally the carrier K² K⁴ lies upon the fine threaded screw J as shown in Figure 1, and it is provided with a knife edge K⁵ or otherwise adapted to engage with the thread of the screw J so that when the latter rotates the carrier may be caused to travel along the
40 bar K.

Upon the base plate A is a socket L having a central vertical hole which accommodates the end of a rod M, the pointed extremity of which serves as a pivot to support the larger end of a sound trumpet N. Slots L¹ are provided
45 in the socket L and pins M¹ upon the rod M engage with these slots when the rod M is in the socket, thus securing a definite position for the pivot of the sound trumpet.

The sound trumpet N may be made of any suitable material preferably non-metallic such for instance as tough paper, thin fibre or celluloid. When sheet
50 material such as celluloid is employed the trumpet is conveniently made by providing the edges of the sheet with metal strips or grips as shown at N¹ in Figure 2, these strips being joined say by soldering. In some constructions only one strip is used its edges being turned over so as to grip the edges of the sheet material of which the trumpet is formed. To the strips N¹ inside the larger end of the trumpet is attached a small clip N² forming a slide into which
55 the edges of a U-shaped piece of metal N³ are inserted. The pointed end of the rod M passes through a hole N⁴ and rests against the inside of the curved portion

Improvements in or relating to Graphophones, Phonographs and the like.

of the U-shaped piece N³. This U-shaped member is preferably formed so that the portion which rests upon the point of the rod M is approximately horizontal, thus obviating the danger of any binding action taking place.

Near the smaller end of the trumpet N a socket O is provided to accommodate the stylus P which may be of any hard material, say for instance glass rod or tubing. The socket O is preferably formed of spring metal and provided with a screw O¹ so that the stylus may be securely gripped. In the construction shown in detail in Figure 3 the ends of the socket are turned in as at O² so that the stylus is gripped by each end of the socket, the clamping screw O¹ being in the middle.

In operation the larger end of the trumpet is pivoted as above described on its supporting rod M, the smaller end passes between the arms of the fork K⁴ of the pivotted carrier and the point of the stylus P rests upon a record cylinder R which is mounted friction tight upon the mandrel C.

It is to be understood that the apparatus is so constructed that the point of the stylus P rests with a slight amount of pressure upon the record R. The carrier K³ K⁴ is not intended to take the weight of the trumpet, its function being primarily to act as a guide for the smaller end of the trumpet and prevent any danger of the point of the stylus quitting the grooves or channels in the record.

In order that the point of the stylus P may be withdrawn from contact with the record R or any adjacent part of the mechanism when the instrument is not in use, a small safety catch or bracket S is provided attached to one of the plates B¹. By depressing the back end of the carrier lever K³, the knife edge K⁵ is disengaged from the screw J and the lower end of the trumpet with the stylus P is lifted in the fork K⁴ and the head K³ is then allowed to rest in the catch S, in which position the stylus is out of contact with adjacent portions of the instrument.

Figures 4 and 5 show portions of sound trumpets made according to an alternative construction of this invention. In each of these forms a pivotted socket N⁵ is provided which accommodates the pointed end of the rod M. In Figure 4 this socket is shown provided with a cross arm N⁶ which is journaled in the downturned ends of a plate N⁷ attached to the trumpet. In the form shown in Figure 5 the socket N⁵ is slotted as at N⁸ and in this slot is a lug N⁹ secured to the trumpet, the lug and the slotted socket being pivotally connected by a pin N¹⁰.

When a clockwork motor is employed instead of having the usual winding key which is screwed on to its stem, the stem may be provided with projecting pins and the crank or key formed with a socket which slips over the stem and slots which accommodate the cross pins. These slots may be oblique and formed in such a direction that a slight turn of the handle brings it into connection with the pins so that the stem may be turned and a corresponding turn in the other direction disengages the handle from the stem.

Although in the above description a cylindrical record is mentioned it will be understood that the various improvements may be adapted to instruments having records of other form such for example as discs. Again the instruments may be adapted for hand or foot driving, or may be operated by means of an electric motor.

When the trumpets are made with detachable flared mouth-pieces, it is preferred to secure the mouth-piece to the main portion of the trumpet by means of screw clamps or the like. Two clamps may be provided at opposite sides of the trumpet which when tightened up grip the rim of the flared portion.

Having now particularly described and ascertained the nature of this invention and in what manner the same is to be performed, I declare that what I claim is:-

1. In a graphophone or the like the combination with a sound trumpet of a pivotted forked carrier substantially as described.

Improvements in or relating to Graphophones, Phonographs and the like.

2. In a graphophone or the like the combination with a pivotted carrier for the sound trumpet, of a catch or rest to hold the carrier and sound trumpet so that the point of the stylus is out of contact with the mechanism when the instrument is out of operation substantially as described.
- 5 3. In a graphophone or the like a pivotal support for the sound trumpet comprising a bent rod such as M M¹ and a slotted socket L L¹ with or without a U-shaped member such as N³ having a horizontal portion which rests upon the pointed extremity of the rod.
- 10 4. In a graphophone or the like the combination with the sound trumpet of a pivotted socket such as N² substantially as described and illustrated in Figure 4 or in Figure 5 of the accompanying drawings.
5. The complete graphophone substantially as described and illustrated in Figure 1 of the accompanying drawings.

Dated this 4th day of October, 1901.

15
WALTER C. RUNGE,
Boulton, Wade & Kilburn,
Agents for the Applicant.

A.D. 1901 MAY 10. N^o 9727.
RUNGE'S COMPLETE SPECIFICATION.

(2nd Edition)

(1 SHEET)

Fig. 1

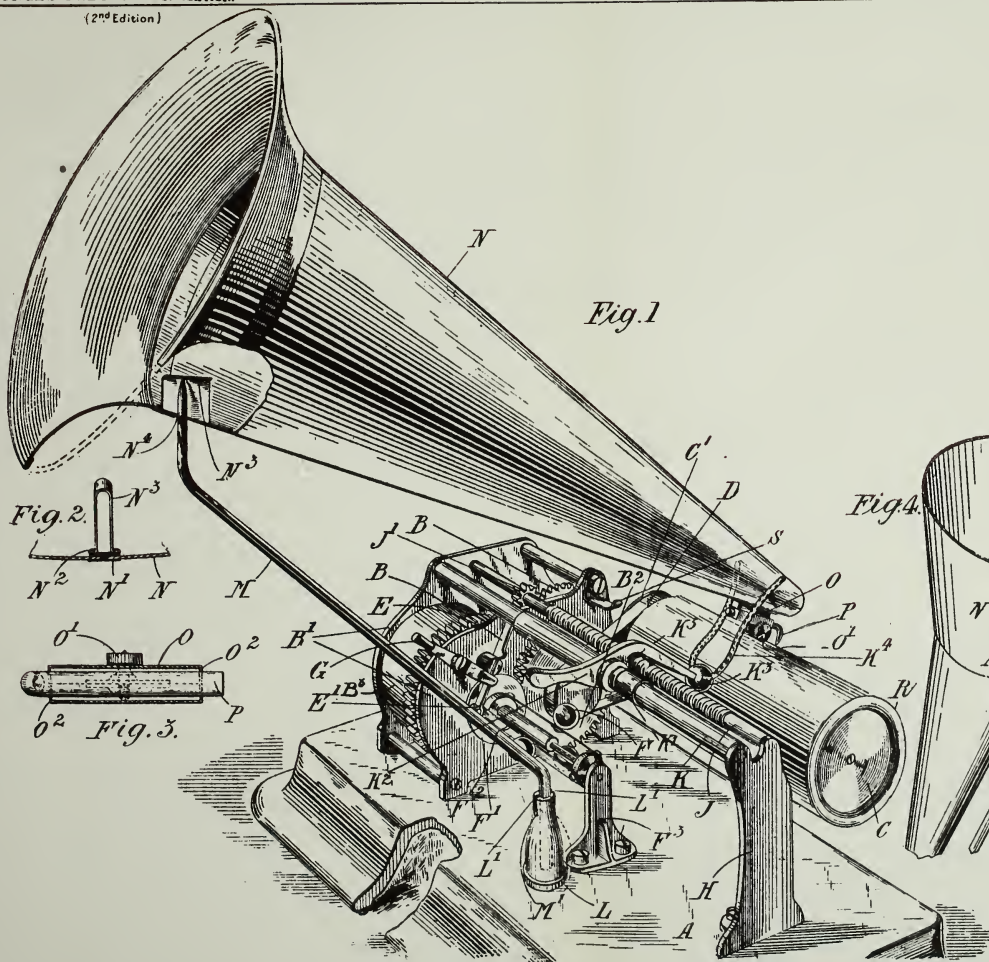


Fig. 4.

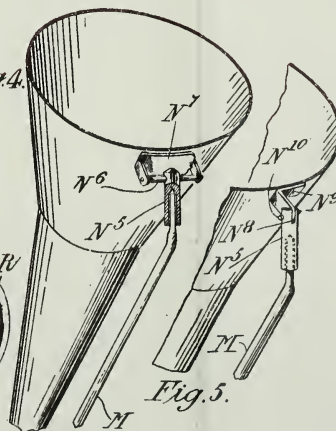


Fig. 5.

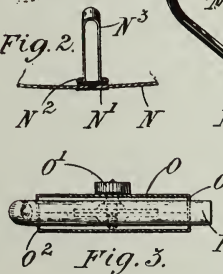
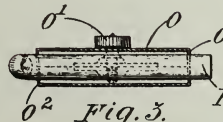


Fig. 3.



This Drawing is a reproduction of the Original on a reduced scale.



N^o 22,273

A.D. 1901

Date of Application, 5th Nov., 1901

Complete Specification Left, 25th July, 1902—Accepted, 5th Nov., 1902

PROVISIONAL SPECIFICATION.

**"Improvements in or relating to the Sound Trumpets of
Graphophones, Phonographs and the like".**

I, WALTER C. RUNGE, Engineer, of 49 Queen Victoria Street, in the County of London, do hereby declare the nature of this invention to be as follows:—

This invention relates to the sound trumpets of graphophones, phonographs and the like, its object being the construction of a sound trumpet which shall have improved sound producing qualities and at the same time be simple to manufacture.

Sound trumpets according to this invention are made of sheet material say for example celluloid or the like, the edges being joined in any convenient way, but preferably by means of a metal clip running along the entire length of the sound trumpet and provided at one end with a clip or other accommodation for a stylus.

Instead of being circular in cross section throughout its length the improved sound trumpet is approximately elliptical and is provided with means for stiffening it at its periphery at points near the ends of the longer axis of the ellipse. Preferably the metal clip before mentioned serves to strengthen one side of the sound trumpet and opposite to it a fold or crease is made in the material forming the sound trumpet, this crease serving to stiffen the other side of the trumpet and cause it to retain its elliptical shape. If desired, however, a second strip or clip or a series of clips may be attached to the sound trumpet instead of or in addition to the fold or crease.

In order that sound trumpets according to this invention may be used with circular flared metal ends of the usual type it is preferred to make the crease or other strengthening device stop short just before it reaches the larger end of the trumpet which can then be easily placed within the circular end. When this is done the complete sound trumpet is of course circular in cross section at the point adjacent to the end piece, but throughout the other portion of its length it is, as before mentioned, of elliptical or approximately elliptical shape.

Dated this 5th day of November, 1901.

WALTER C. RUNGE.
Boult Wade & Kilburn
Agents for the Applicant

COMPLETE SPECIFICATION.

**"Improvements in or relating to the Sound Trumpets of
Graphophones, Phonographs and the like".**

I, WALTER C. RUNGE, Engineer, of 49 Queen Victoria Street, in the County of London, do hereby declare the nature of this invention to be as follows:—
[Price 8d.]

Improvements in or relating to the Sound Trumpets of Graphophones, &c.

of London, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement—

This invention relates to the sound trumpets of graphophones, phonographs and the like, its object being the construction of a sound trumpet which shall have improved sound producing qualities and at the same time be simple to manufacture.

Sound trumpets according to this invention are made of sheet material, say for example celluloid or the like, the edges being joined in any convenient way, but preferably by means of a metal clip running along the entire length of the sound trumpet and provided at one end with a clip or other accommodation for a stylus.

Instead of being circular in cross section through-out its length the improved sound trumpet is approximately elliptical and is provided with means for stiffening it at its periphery at points near the ends of the longer axis of the ellipse. Preferably the metal clip before mentioned serves to stiffen one side of the sound trumpet and opposite to it a fold or crease is made in the material forming the sound trumpet, this crease serving to stiffen the other side of the trumpet and cause it to retain its elliptical shape. If desired, however, a second strip or clip or a series of them may be attached to the sound trumpet instead of or in addition to the fold or crease.

In order that sound trumpets according to this invention may be used with circular flared metal ends of the usual type it is preferred to make the crease or other strengthening or stiffening device stop short just before it reaches the larger end of the trumpet which can then be easily placed within the circular end. When this is done the complete sound trumpet is of course circular in cross section at the point adjacent to the end piece, but throughout the other portion of its length it is, as before mentioned, of elliptical or approximately elliptical shape.

In the accompanying drawings which illustrate one construction of sound trumpet according to this invention—

Figure 1 is a perspective view,

Figure 2 is a transverse section on the line 2—2 of Figure 1 and

Figure 3 is a similar section on the line 3—3 of Figure 1

Like letters indicate like parts throughout the drawings.

The sound trumpet A is made of flexible sheet material such as celluloid, its edges being joined by a metal clip B which forms a longitudinal stiffener along one side of it and is attached at the smaller end of the trumpet to a band B¹ encircling the trumpet and carrying a stylus B² in a socket B³. Another stiffener is provided preferably at or near the opposite side of the trumpet and this second stiffener in the example illustrated takes the form of a crease or bend C, which as well as stiffening the trumpet imparts to it a shape in cross section somewhat similar to that shown in Figure 2.

In order that the improved sound trumpet may be used with a flared mouth piece of the usual circular shape, the crease or fold is not carried quite to the larger end of the sound trumpet but stops short of that point as shown in Figure 1. The larger end of the trumpet is thus adapted to fit the mouth piece as its shape in cross section, as shown in Figure 3, is approximately circular.

The second stiffener instead of being in the form of a fold or crease may be constituted by a metal clip or strip attached to the outside or inside of the trumpet.

Having now particularly described and ascertained the nature of this invention and in what manner the same is to be performed, I declare that what I claim is—

1. In a graphophone or the like a sound trumpet having two or more longitudinal stiffeners substantially as described.

2. In a graphophone or the like a sound trumpet of flexible material fastened

Improvements in or relating to the Sound Trumpets of Graphophones, &c.

by a longitudinal clip B and provided with a stiffening fold or crease C substantially as described.

3. The sound trumpet for a graphophone or the like substantially as described and illustrated in the accompanying drawings.

5 Dated this 24th day of July 1902.

WALTER C. RUNGE.
Boulton & Wade & Kilburn
Agents for the Applicant.

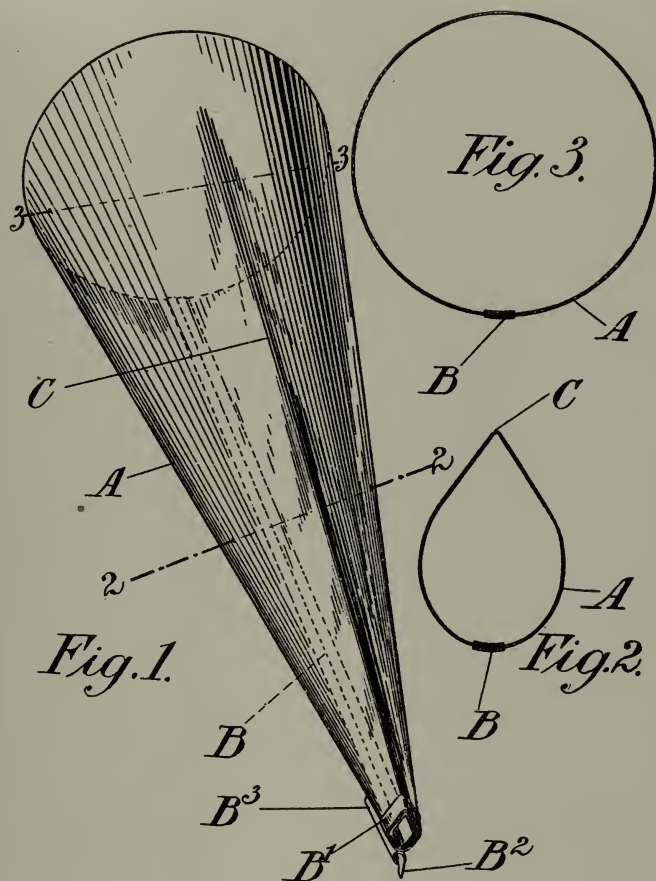
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[Wt. 25-25/4/196]

A.D. 1901. Nov. 5. N^o 22,273.
 RUNGE'S COMPLETE SPECIFICATION.
 (2nd Edition)

(1 SHEET)

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N^o 17,786

A.D. 1902

Date of Application, 13th Aug., 1902—Accepted, 25th Sept., 1902

COMPLETE SPECIFICATION.

Improvements in Phonographs and other Talking Machines.

I, HENRY FAIRBROTHER of 49 Kestrel Avenue, Herne Hill London S.E. Metal Trades' Valuer, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

5 My invention relates to that class of talking machine in which the reproduction of sound is produced by attaching a stylus to a trumpet, said trumpet being vibrated direct by the stylus from the record which carries the sound writing. The principal features of the invention are the method of attaching the said stylus to the trumpet, the material of which the trumpet is formed the formation of a longitudinal rib on the trumpet practically normal to the side thereof, the method
10 of supporting the trumpet and of forming the joints therein and also the addition to the said trumpet of an internal tongue to increase the vibration.

My trumpet may be of any suitable form but is preferably cone or funnel shaped and is provided with a flanged or bell shaped mouth. I form the trumpet
15 chiefly or entirely of sonorous material such as gelatine, indurated fibre, celluloid, paper or the like and compose it of one or more sheets of the same. By preference I make it of two or three sheets and of different materials, said sheets being in the form of layers or folds which are stuck together by any suitable adhesive substance. For instance, I may use a sheet of gelatine or cellulose material, backed
20 up with a sheet of fibrous material such as paper, or of a sheet of cellulose material and a sheet of gelatine material stuck together. The object in using more than one sheet is for cheapness of manufacture as well as to improve the tone, as a certain thickness is required to obtain good results. I therefore use a thin sheet of the more expensive material and get the required thickness of the trumpet by
25 backing it up with cheaper material.

I employ several methods of forming the rib on the trumpet as well as several methods of attaching the stylus to the trumpet and also several methods of forming the trumpet from the sheet or sheets of material.

I will now describe my invention with reference to the accompanying drawings
30 in which:—

Fig. 1 shows an elevation of a cone-shaped trumpet partly in section, provided with a bell mouth which trumpet is constructed mainly of gelatine, indurated fibre, celluloid, paper or any other suitable sonorous material. By preference I form it from one sheet of material with a lap joint or turnover seam, longi-
35 tudinally and glued or cemented together.

This trumpet is fitted at its smaller end with a plug of suitable material such as wood, the end of which, projects outside and in which a hole is cut to receive a stylus which is preferably made of glass. The wood plug is preferably formed with a saw cut or split in order to give it a springy grip of the stylus. The wood
40 plug is extended inside the trumpet in the shape of a thin flat tongue wider at its outer end to conform to the shape of the trumpet, to the walls of which it may be fastened if desired. This tongue greatly improves the reproductions but is not essential. If desired a small piece of cloth, leather or rubber may be held between the tongue and the wall of the trumpet where it is fastened or in contact
45 to still further improve the reproduction. The tongue is shown split as this further increases its usefulness and allows it to vibrate more freely with the walls

[Price 8d.]

Fairbrother's Improvements in Phonographs and other Talking Machines.

of the trumpet. Instead of having a hole for the stylus, the plug may be provided with a point or pin over which a hollow stylus is fitted.

This drawing also shows one method which I adopt for supporting the trumpet from close under the bell shaped mouth.

Fig. 2. is a plan view of Fig. 1, the bell mouth and wide end of the trumpet not being shown. 5

Fig. 3 is a side elevation of another form of trumpet and shows a different method of attaching the stylus to the same. In this case a block of suitable material, such as wood, is inserted in the end of the trumpet and is centrally bored to receive the stylus which may be permanently or removably fixed therein. The drawing shows the stylus resting on a record of the usual cylindrical shape. 10

Fig. 4 shows a side elevation of a trumpet provided with a rib on its under side to which is attached the support of the trumpet and also a clip to hold the stylus.

Fig. 5 is an enlarged sectional view on the line *x* of the end of the trumpet and of the clip and stylus shown in Fig. 4. 15

Fig. 6 is a sectional view on the line *y* of the trumpet shown in Fig. 4 and

Fig. 7 is a sectional view on the line *z* of the trumpet shown in Fig. 4.

Fig. 8 shows a perspective view of a grooved block which I use by preference for the formation of the folded or pressed rib such as that shown in Fig. 6

Fig. 9 is a sectional view of a part of the body of the trumpet and shows how I arrange the various sheets, in this case three in number, forming the same so that their joints overlap and do not come directly underneath or next to each other. 20

Fig. 10 is a view similar to Fig. 9 showing two sheets only.

Fig. 11 is a side elevation of a complete phonograph or talking machine showing the relative position of the parts, the means I adopt of supporting the trumpet from its smaller end and the method of attaching the stylus to the rib at about half way up the same. 25

Fig. 12 is a sectional view of the rib of a trumpet, such for instance as that shown in Fig. 11 and shows a U shaped cap which is clamped over the rib to strengthen it. 30

Fig. 13 is a plan view of the talking machine shown in Fig. 11.

Fig. 14 is a side elevation of a trumpet formed from one piece or strip of sonorous material which has been wound round a cone-shaped form to produce the desired shape, the edges of the said strip overlap each other so as to break joints. A double thimble or cap like clip is fitted to the end of the trumpet and also carries the stylus. The larger end of the trumpet rests on a double or universal joint to give free lateral and vertical movement and is supported by a swing rod. 35

Fig. 15 is a front view of the larger end of the trumpet shown in Fig. 14 and more clearly shows the joint by which the trumpet has free lateral or vertical movement. 40

Fig. 16 is a side elevation of a trumpet made from two strips of material which are wound round each other the joints overlapping so as to break the same. This trumpet is provided with a rib on its under side and is fitted with a cap at its smaller end to which the stylus is attached. 45

Fig. 17 is a section of the trumpet shown in Fig. 16 and shows a form of rib which is attached after the trumpet is made.

Fig. 18 represents a method of forming the trumpet with a rib which may be rivetted or cemented.

Fig. 19 is an end view of the same. 50

Referring to Figs. 1 and 2 *a* is the trumpet fitted with bell mouth *a*¹ and at its smaller end with plug *b*, to plug *b* is fitted or fixed the tongue *b*¹ which is split as shown and as rubber or other suitable material *c* at its ends. The other or outer end of the plug is formed in the shape of a ball and holds the stylus *s*, said ball being split or cut at *h* to improve the grip. 55

To the wider end of the trumpet is fitted a band *d* provided with lugs carrying joint *e* to which is attached an inverted bearing *g* for the bracket or swing rod *f*

Fairbrother's Improvements in Phonographs and other Talking Machines.

thus making a universal joint and giving free lateral and vertical movement to the trumpet.

Referring to Fig. 3, *a* is a trumpet of which the lower or narrower end only is shown, this end is fitted with plug *b* which is bored with a central hole *i* to which the stylus *s* is fitted. The stylus *s* is shown resting on the record *w*.

Referring to Figs. 4, 5, 6, and 7 *a* is the trumpet fitted with bell mouth *a'* and rib *k* the upper part of which, *k'* has been folded or turned back again. the trumpet *a* to allow the bell shaped mouth *a'* to pass over it. To the lower end of rib *k* is fitted clip *l* made of any suitable material which carries the stylus *s*. The stylus is preferably removable being pushed into a slot *l'* in the clip *l*. The stylus rests on the record or sound writing by gravity or spring tension.

Referring to Fig. 8. The block *p* is grooved as shown at *p'*, this is used to hold the folded or turned edges forming the rib *k* when made until the adhesive substance used in them has become hard or set.

In Figs. 9 and 10, the separate layers of material *a*, *a'*, and *a''* may be formed of different material, for instance *a* may be gelatine *a'* may be paper and *a''* may be of gelatine or any other suitable material. The ends or edges *j* of these separate materials do not lie directly over one another or in the same line.

Referring to Figs. 11 and 13, the trumpet *a* is formed with a joint or rib *k* shown in cross-section in Fig. 12, which joint is covered with a U shaped cap *q* which fits closely over the rib and holds the joint securely. This trumpet is hung from the small end and the stylus *s* is attached to the rib at a point *l* some distance from the smaller end of the trumpet. The rod *o* is fastened to the trumpet at *o'* which is hinged at *o''* to allow a free vertical movement about *o''* as a centre, the vertical rod *o'* is also pivotted at *o''* and rests loosely in the standard *o''* so as to allow a free lateral movement about *o''* as a centre. This standard is fixed to the base of the machine. The stylus *s* rests in the record by gravity and traverses the spiral sound writing of the record as it rotates. The record *w* may be turned by a suitable handle such as *w'* or it may be turned by clockwork or other suitable means.

Referring to Figs. 14 and 15 *a* is the trumpet formed spirally from a strip of material. At the lower end of the trumpet is fitted the double cap or thimble *r* one end of which embraces the trumpet and the other holds the stylus *s*.

To the wider end of the trumpet is attached a plate *t* formed with a lug *m* to which is jointed an inverted bearing *g* in which the spring rod *o* is free to work.

Referring to Fig. 16 the trumpet is formed from two strips *a'* and *a''* of material wound one over the other so as to break joints, the rib *k* may be attached afterwards as shown at *k* in Fig. 17.

Figs. 18 and 19 show another form in which I may make my trumpet, in this case the edges of the material are turned out and rivetted together as shown at *r* and a clip *l* is attached thereto to hold the stylus *s*.

I do not confine myself to any particular form or shape of the plug or of the tongue and the trumpet may be round, oval or any other suitable cross section.

In any of the above trumpets a single sheet or a sheet composed of more than one sheet of different materials stuck together may be used.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed I declare that what I claim is:—

1. A trumpet for phonographs or talking machines formed mainly of a sheet of sonorous material of a conical or pyramidal shape with a plug for attaching stylus fitted in its smaller end, said plug terminating in a vibratory tongue or plate, fitted to the inside of the trumpet, substantially as herein described and set forth.

2. A trumpet for phonographs or talking machines formed mainly of a sheet of sonorous material of conical or pyramidal shape with a plug for attaching stylus fitted in its smaller end, said plug terminating in a vibratory tongue or plate

Fairbrother's Improvements in Phonographs and other Talking Machines.

fitted to the inside of the trumpet said tongue having a longitudinal slit to increase vibration, substantially as herein described and set forth.

3. A trumpet for phonographs or talking machines constructed mainly of a sheet of sonorous material and means for attaching the stylus by a plug in small end of trumpet with a hole in outer end of said plug for receiving the stylus, substantially as herein described and set forth.

4. A trumpet for phonographs or talking machines constructed mainly of a sheet of sonorous material and means for attaching the stylus by a plug in small end of trumpet with hole in outer end of said plug for receiving the said stylus, said plug being slitted or cut as shown at Fig. 2 for the purpose of gripping said stylus, substantially as herein described and set forth.

5. A trumpet for phonographs or talking machines constructed mainly of a sheet of sonorous material joined together by lap folded joints, cemented or glued and means for attaching stylus, thereto substantially as herein described and set forth.

6. A trumpet for phonographs or talking machines fitted with a stylus said trumpet being formed of layers or sheets of different sonorous material stuck together substantially as herein described and set forth.

7. A trumpet for phonographs or talking machines fitted with a stylus, said trumpet being formed of one or more sheets of sonorous or resonant material with a seam or longitudinal joint, such as described in various figures of drawings hereto annexed and substantially as herein of drawings hereto annexed and substantially as herein described and set forth.

8. A trumpet for phonographs or talking machines with a normal projecting rib and a stylus attached thereto, substantially as herein described and set forth.

9. The methods of attaching the stylus to the trumpet substantially as herein described.

10. A trumpet formed by winding two layers of strip material, as shown in Fig. 15 herein and a stylus attached thereto substantially as herein described.

11. A trumpet formed by winding one strip of material with the edges overlapping into a cone or funnel shape substantially as herein described and as shown in Fig. 14 of the annexed drawings.

Dated this 13th. day of August 1902.

HY. FAIRBROTHER,
33 Cannon St London. E.C.

A.D. 1902. AUG. 13. N^o. 17,786.

FAIRBROTHER'S COMPLETE SPECIFICATION.

(2nd Edition)

SHEET 1.

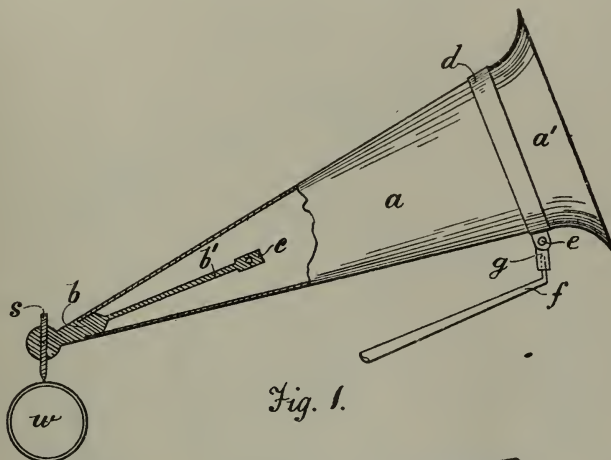


Fig. 1.

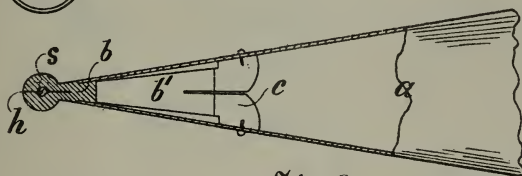


Fig. 2.

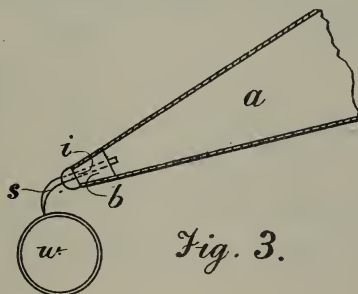


Fig. 3.

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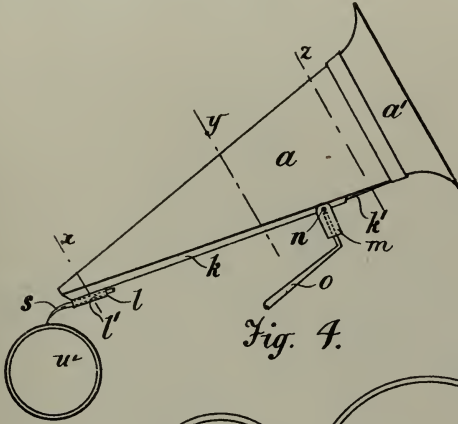


Fig. 4.



Fig. 5.

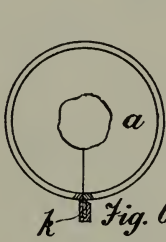


Fig. 6.

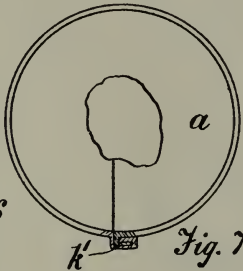


Fig. 7.

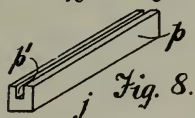


Fig. 8.

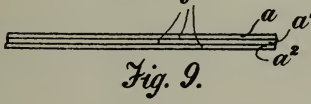


Fig. 9.

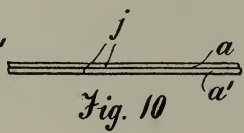


Fig. 10.

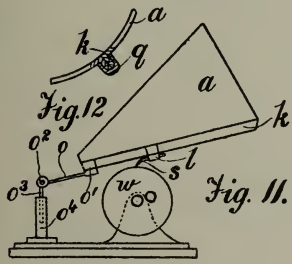


Fig. 11.

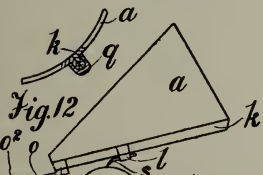


Fig. 12.

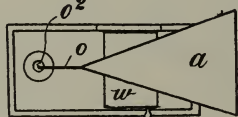


Fig. 13.

(2nd Edition)

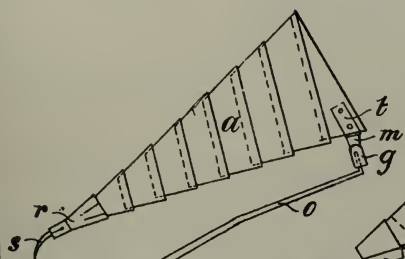


Fig. 14.

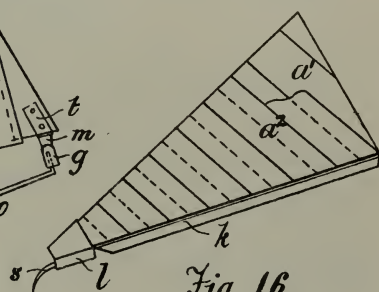


Fig. 16.

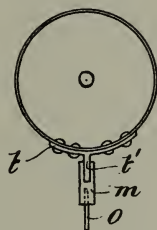


Fig. 15.

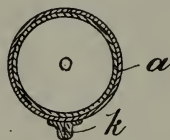


Fig. 17.

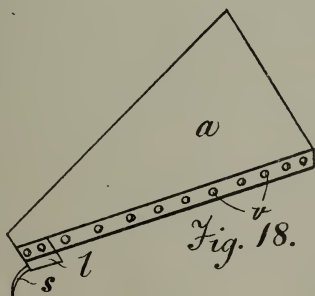


Fig. 18.

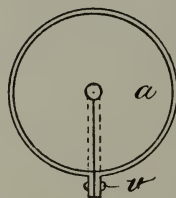


Fig. 19.

[Second Edition.]

N^o 20,146

A.D. 1902

*Date of Application, 15th Sept., 1902**Complete Specification Left, 9th June, 1903—Accepted, 10th Sept., 1903*

PROVISIONAL SPECIFICATION.

Improvements in connection with Horns for Phonographs, Ear Instruments and for like purposes.

I, GUSTAVE HARMAN VILLY, of 5, Longford Place, Longsight, Manchester, Bookbinder, do hereby declare the nature of this invention to be as follows:—

This invention relates to improvements in connection with horns or trumpet like sound distributors or collectors, for use upon phonographs, gramophones, and other like instruments and also for ear trumpets, fog horns, and other sound distributing and collecting devices; the object being to provide a horn or trumpet like device which can be folded when not in use so as to be capable of ready transportation and for placing within the case of the phonograph, or in the pocket of the user when it is to be applied to an ear instrument or the like.

In carrying my invention into effect in one convenient manner when making my folding horn for use particularly in connection with a phonograph or like instrument, I make the end preferably of trumpet like or curved configuration with an enlarged outer end and a smaller end at the interior of the conoidal like form. I make this enlarged and trumpet like device by employing a series of strips of paper, wood, linen, or other preferably flexible material, the inner foundations of which I prefer to make of linen or the like so as to form a hinge like connection between each of the strips the members of which I arrange so that while lying close together when extended, there is a dividing line between them about which they can be folded upon the base of linen or the like connecting web upon which the paper or other material is mounted. The longitudinal hinged edges of the flexible segments or sectors are curved in such manner that, although the segments when opened out cannot lie in the same plane, they can either be folded together in a zig zag manner so as to lie parallel to one another, or extended by springing or buckling into the requisite trumpet or bell like form. The angles formed by the meeting of the hinged segments when extended form as it were ribs giving rigidity to the trumpet form. The outer ends of the segmental like strips I prefer to protect by a bent or turned over edging of metal, making the connection rigid by pressing a portion of the strip of metal or other binding material into the edge of the paper or the like foundation.

Upon the extreme member of the series of strips thus formed into one band I provide eyelets or other clip like devices for enabling the opposite end strip to be engaged therewith and when thus engaged to form a completed trumpet like sound distributor.

Instead of arranging eyelets or hook like clips upon the outer members of the series of strips I may make one to engage with the other by forming a bead like connection or flange upon one member into which the corresponding projecting or engaging portions of the other may enter. When providing for an extension and a long funnel like carrier for the built up trumpet like end to engage with I sometimes make a conical tube the enlarged end of which engages with the inner end of the trumpet terminal while the smaller end of the cone engages with the receiver of the phonograph or enters into the rubber or other tubular or flexible connection which may be employed for use upon any particular instrument. I prefer to make this extended or carrying member

[Price 8d.]

Improvements in connection with Horns for Phonographs, Ear Instruments, &c.

for the collapsible trumpet from paper or other suitable material built up in a similar manner to that hereinbefore described, to my collapsible end, or the cone may be made in a short length in one piece or it may be made telescopic when so desired.

When providing for a flexible connection at the extreme end of the cone I attach a length of rubber or the like tubing which I bind with metal or other band at the end for the purpose of inserting it upon the funnel of the phonograph reproducer, and I stiffen the combination trumpet and funnel with flexible end by providing one or more bars of metal or the like stiffeners which support the funnel by means of elastic or other connections arranged upon the cone and suspended from the projecting stiffening hook or members carried from the metal end or binder of the flexible tube.

When constructing a funnel or tube for an ear trumpet or for a fog or speaking horn or the like, I employ the same method of building up the segments to form the expanding surface, modifying the arrangement of the inner end to suit the connection that is to be made therewith, so that when the trumpet is in use it can be extended and a large outer area exposed for the collection of sound and when not in use it can be folded each segment upon the other so as to occupy but little space.

I do not limit the application of my invention to any particular method of building up the segments or to any special curve or configuration of the same, and I vary the method of jointing and stiffening them to suit the material from which the strips are constructed and the foundation or base fabric upon which the flexible material forming the strips is secured.

Dated this 15th day of September 1902.

MARKS & CLERK

18, Southampton Buildings, London, W.C.
13, Temple Street, Birmingham, and
30, Cross Street, Manchester, Agents.

COMPLETE SPECIFICATION.**Improvements in connection with Horns for Phonographs, Ear Instruments and for like purposes.**

I, GUSTAVE HARMAN VILLY, of 5 Longford Place, Longsight, Manchester, Bookbinder, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to improvements in connection with horns or trumpet-like sound distributors or collectors, for use upon phonographs, gramophones, and other like instruments and also for ear trumpets, fog horns, and other sound distributing and collecting devices; the object being to provide a horn or trumpet-like device which can be folded when not in use so as to be capable of ready transportation and for placing within the case of the phonograph, or in the pocket of the user when it is to be applied to an ear instrument or the like.

The accompanying drawings represent one form of the invention.

Figure 1 being an elevation of the complete or erected horn.

Figures 2, 3 and 4, are detail views illustrating the manner in which the horn can be collapsed or folded.

Figure 5 is a perspective view illustrating one convenient application of the improved horn to a phonograph.

Figure 6 is a detail view on an enlarged scale.

Figures 7 and 8 are views illustrating an alternative method of folding a horn constructed according to one form of the invention.

Improvements in connection with Horns for Phonographs, Ear Instruments, &c.

In carrying my invention into effect in one convenient manner when making my folding horn for use particularly in connection with a phonograph or like instrument, I make the end *a* of trumpet-like or curved configuration with an enlarged outer end and a smaller end at the interior of conoidal like form. I make this enlarged and trumpet like device by employing a series of strips *a* of paper, wood, linen, or other preferably flexible material, the foundations of which I prefer to make of linen or the like so as to form a hinge-like connection *c* between each of the strips, the members *b* of which I arrange so that while lying close together when extended, there is a dividing line between them about which they can be folded upon the base of linen or the like connecting web upon which the paper or other material is mounted. The longitudinal hinged edges *c* of the flexible segments or sectors *b* are curved in such a manner that, although the segments when opened out cannot lie in the same plane, they can either be folded together in a zigzag manner so as to lie parallel to one another as shown in Figures 2 to 4 or extended by springing or buckling into the requisite trumpet or bell like form as shown in Figures 1 and 5. The angles formed by the meeting of the hinged segments when extended form as it were ribs giving rigidity to the trumpet form. The outer ends of the segmental like strips I prefer to protect by a bent or turned over edging *d* of metal, making the connection rigid by pressing a portion of the strip of metal or other binding material into the edge of the paper or the like foundation.

Upon the extreme member *e* of the series of strips *b* thus formed into one band I provide eyelets *f* or other clip-like devices for enabling snap projections *h* on the opposite end strip *g* to be engaged therewith and when thus engaged to form a completed trumpet-like sound distributor.

Instead of arranging eyelets or hook-like clips upon the outer members of the series of strips I may make one to engage with the other by forming a head-like connection or flange *k* upon one member into which the corresponding projecting or engaging portions of the other may enter as shewn in Figure 6. Instead of temporarily joining the edges of the extreme members as above described, I may permanently secure them by flexible connections. The flexible covering or foundation of the horn may be made to pass right round or over all the segments. In such a case, however, the horn cannot be collapsed or folded into such a compact form as in Figure 4, but can be folded into a comparatively small and compact form as shown in Figures 7 and 8. When providing for an extension and a long funnel-like carrier for the built up trumpet-like end *a* to engage with I sometimes make a conical tube *l* the enlarged end of which engages with the inner end of the trumpet terminal *a* while the smaller end of the cone engages with the receiver *m* of the phonograph or enters into the rubber or other tubular or flexible connection which may be employed for use upon any particular instrument. I prefer to make this extended or carrying member *l* for the collapsible trumpet from paper or other suitable material built up in a similar manner to that hereinbefore described to my collapsible end, or the cone may be made in a short length in one piece or it may be made telescopic when so desired.

When providing for a flexible connection at the extreme end of the cone *l*, I attach a length of rubber or like tubing *n* which I bind with metal or other band at the end for the purpose of inserting it upon the funnel *o* of the phonograph reproducer, and I stiffen the combination trumpet and funnel with flexible end by providing one or more bars *p* of metal or the like stiffeners which support the funnel by means of elastic or other connections *q* arranged upon the cone end and suspended from the projecting stiffening hook or members *p* carried from the metal end or binder of the flexible tube *n*.

When constructing a funnel or tube for an ear trumpet or for a fog or speaking horn or the like, I employ the same method of building up the segments to form the expanding surface, modifying the arrangement of the inner end to suit the connection that is to be made therewith, so that when the trumpet

Improvements in connection with Horns for Phonograph⁺, Ear Instruments, &c.

is in use it can be extended and a large outer area exposed for the collection of sound and when not in use it can be folded each segment upon the other so as to occupy but little space, that is to say a trumpet such as illustrated in Figures 1 to 4 would be suitable as an ear trumpet.

I am aware that it has hitherto been proposed to form conical or pyramidal horns from cardboard provided with a linen foundation, but such horns have been made up from a single flat scored sheet or from a number of flat triangular strips having straight edges. Such horns could be developed or laid out upon a flat surface. Owing to their formation, if such horns were made collapsible they would have to be sustained in their conical form by additional sustaining means, or if they were made self-sustaining they could not be made collapsible. In contradistinction to this my collapsible horn could not be made up from a single flat sheet, as each strip has to be made with curved edges, and when the strips are flexibly secured together at such curved edges the whole or complete surface so formed cannot be laid out or developed on a flat surface. My horn, owing to the curvature of the edges of the strips is self-sustaining and requires no additional stiffening or sustaining devices, although when it is desired to collapse the horn this may be effected by forcibly straightening and folding the strips one against the other in the manner hereinbefore described with reference to Figures 2, 3, and 4, or to Figures 7 and 8. The horn when erected offers a decided resistance to such straightening or folding sufficient to render it self-sustaining against all ordinary shocks liable to be encountered, but it is found that when one strip has been forcibly straightened or folded against another the equilibrium of the trumpet is destroyed and the whole may be easily collapsed.

I do not limit the application of my invention to any particular method of building up the segments or to any special curve or configuration of the same, and I vary the method of jointing and stiffening them to suit the material from which the strips are constructed and the foundation or base fabric upon which the flexible material forming the strips is secured.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A collapsible but self-sustained phonograph horn, ear trumpet or the like, comprised of a number of flexible strips having curved meeting edges, substantially as hereinbefore described.

2. A collapsible but self-sustained phonograph horn, ear trumpet or the like comprised of a number of flexible strips having curved meeting edges, a flexible foundation for said strips and means for detachably securing the two extreme strips together, substantially as hereinbefore described.

3. A phonograph horn, ear trumpet or the like comprising a rigid conical tube and a collapsible trumpet-shaped mouth telescoped thereon or otherwise secured thereto, such mouth being made up of a number of flexible strips having curved meeting edges and flexible connections at such edges, substantially as hereinbefore described.

4. An improved phonograph horn, ear trumpet or the like substantially as hereinbefore described with reference to Figures 1 to 6 of the drawings.

5. An improved phonograph horn, ear trumpet or the like substantially as hereinbefore described with reference to Figures 7 and 8 of the drawings.

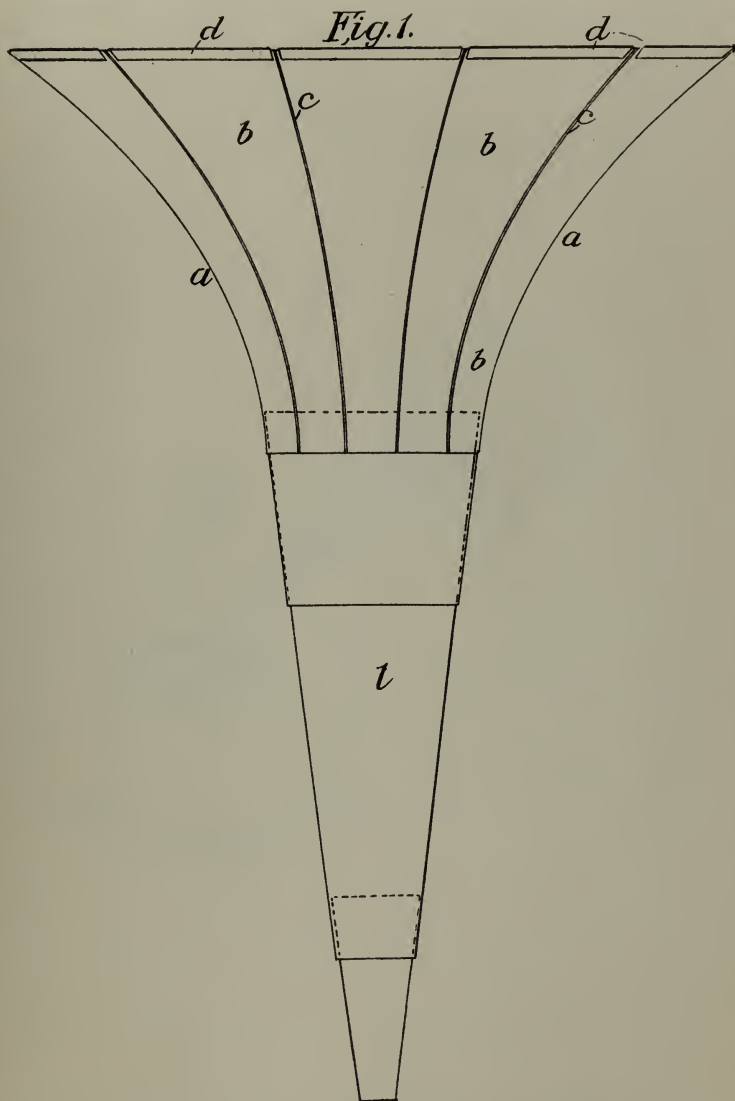
Dated this 9th day of June, 1903.

MARKS & CLERK 50

A.D. 1902. SEP. 15. N^o 20,146.
VILLY'S COMPLETE SPECIFICATION.

(2nd Edition)

SHEET 1



[This Drawing is a reproduction of the Original on a reduced scale.]

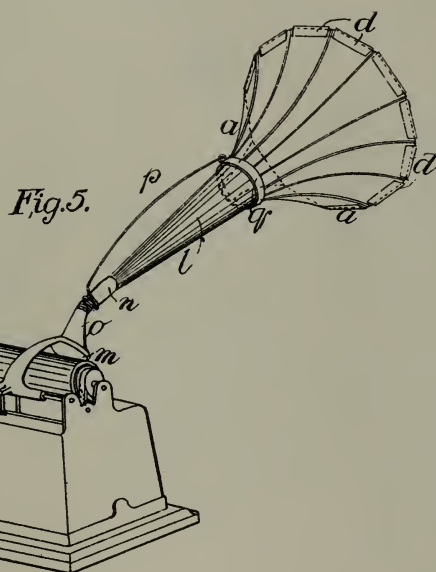


Fig. 1.



Fig. 2.



Fig. 3.

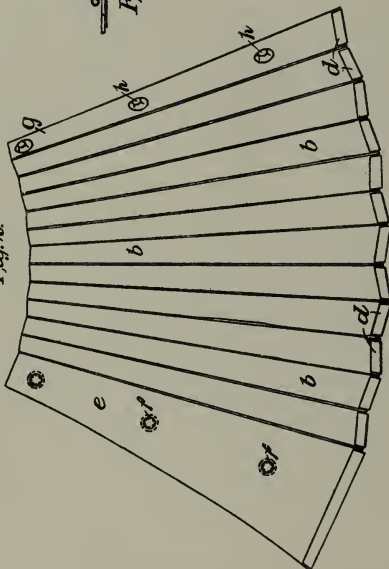


Fig. 4.

Fig. 5.

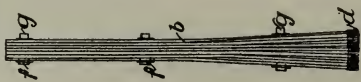
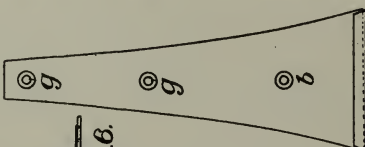


Fig. 6.



[This Drawing is a reproduction of the Original on a reduced scale]

[Second Edition.]

N^o 20,567

A.D. 1902

Date of Application, 20th Sept., 1902

Complete Specification Left, 18th June, 1903—Accepted, 20th Aug., 1903

PROVISIONAL SPECIFICATION.

“Improvements in Phonographs”

I, JOHN MESNY TOURTEL of 146A Queen Victoria Street, London E.C. Consulting Engineer, do hereby declare the nature of this invention to be as follows:—

My invention relates to improvements in or relating to phonographs. These improvements are primarily devised to render more efficient and satisfactory that type of apparatus in which a horizontal cylinder revolved by suitable apparatus, forms the support for the hollow cylindrical record, and the horn rests upon the surface of the said record by means of a stylus attached to its small end, which stylus follows the helical line traced by the recording point upon the surface of the record cylinder and thus reproduces the sounds inscribed thereon.

My improvements in this apparatus relate to the following points of the construction.

THE COVER.

In place of the exposed cylinder and partially exposed driving mechanism hitherto employed, I have devised a cover so arranged that all the working parts of the mechanism are enclosed without hindrance to their satisfactory operation. My cover which is of any convenient shape and preferably of sheet metal, is attached to the base plate of the mechanism by means of a long pin or bolt passing vertically upwards and provided with a milled nut, which nut is screwed upon the threaded end of the bolt which passes through the hole in the top of the casing. Similar apertures at the sides enable the insertion of the key and of the check screw, which prevents the revolution of the driving shaft. The end of the casing surrounding one end of the revolving cylinder is open and the record can be slipped into its place or removed therefrom without disturbing the cover. The cover is moreover slotted at the top, above the record, the said slot being of sufficient width to allow for the travel of the stylus from one end to the other of the record. By means of this cover, the working parts are efficiently enclosed, and the appearance of the apparatus is greatly improved.

THE HORN.

The horn may be made of sonorous material in the well known manner. At the small end thereof, the stylus is cemented in or fastened to a plug fitted in the point of the said horn. I find that the preferable method of attachment is to cement the said stylus by means of a fabric and gelatine, or the like cement, to the material of which the horn is composed. But any other suitable cement may be employed whereby the stylus can be securely attached to the aforesaid plug, and this in turn intimately secured to the end of the horn. A further improvement relating to the horn consists in the means of supporting the same and imparting to it a sufficient pressure to cause the stylus to rest firmly upon the record. The horn itself being extremely light in proportion to its bulk, does not afford sufficient pressure by its weight alone. I therefore secure to the preferably metallic mouthpiece of the horn, a socket

[Price 8d.]

Tourtel's Improvements in Phonographs.

working in pivots and adapted to fit over a bent wire or the like support which is arranged to fit in a hollow socket formed by perforating one of the supporting feet of the base plate. The socket attached to the horn by its pivots is also attached to it by means of a spiral spring fixed in such a position that when the apparatus is in position with the socket upon the wire support and the stylus upon the record, the said spiral spring will be extended to the required degree to give the necessary downward pressure to the horn and thereby ensure the close contact of the stylus with the record.

THE STYLUS.

This portion of the invention is improved as follows. I provide a long stylus of suitable material. This stylus may be a solid one or it may be more conical in shape than that hitherto in use, and hollow internally. In either case, the length of the stylus is considerably increased over the ordinary construction, and the top of it is formed in the shape of a disc or ring, intimately attached to the diaphragm of the horn.

THE SUPPORTS.

In my improved construction, I provide firstly a support for the point of the stylus when the apparatus is out of operation. By this means, I can without dismounting the machine or leaving the stylus resting upon the record, or without providing another support for the horn, place the instrument instantaneously out of operation and return it to the working position again, equally quickly. The support for the stylus, consists of a little cup or box of any convenient shape, preferably secured to the top of the cover at one end of the slot for the stylus, already described. The bottom of this cup or receptacle is formed of some soft material, such as soft rubber, and upon this the point of the stylus can rest without injury. The supports of the base plate are formed in the shape of legs, preferably cast in one piece with the said plate, and three in number. On one of these legs is a hollow socket provided with a milled ridge on the outside, and internally threaded to fit the threaded foot cast in one piece with the plate. This socket serves to adjust the level of the apparatus. The front foot is formed hollow and serves as the socket for the end of the bar or wire supporting the horn. The upper edge of this socket is preferably notched to receive the cross pin in said support thereby holding the same rigidly in one position. The third leg may be adjustable or not, as desired.

Although in the foregoing, I have set forth the construction as found preferable at the present time, I do not limit myself to the details therein set forth; thus for instance, I may have more than three supporting legs, or I may attach my cover otherwise than by the long bolt described, and other alterations of design may be made, which are within the capacity of an experienced mechanic. But such alterations of the detail of the apparatus will remain within the scope of my invention herein set forth.

Dated the 20th day of September 1902.

W. P. THOMPSON & Co.
322, High Holborn, London, W.C.
Patent Agents.

COMPLETE SPECIFICATION.

"Improvements in Phonographs".

I, JOHN MESNY TOURTEL of 146A Queen Victoria Street, London E.C. Consulting Engineer, do hereby declare the nature of this invention and in what

Tourtel's Improvements in Phonographs.

manner the same is to be performed to be particularly described and ascertained in and by the following statement:—

My invention relates to improvements in or relating to phonographs. These improvements are primarily devised to render more efficient and satisfactory that type of apparatus in which a horizontal cylinder revolved by suitable apparatus, forms the support for the hollow cylindrical record, and the trumpet rests upon the surface of the said record by means of a stylus attached to its small end, which stylus follows the helical line traced by the recording point upon the surface of the record cylinder and thus reproduces the sounds inscribed thereon.

In order to make my invention more clear, I have illustrated it in the accompanying drawings in which

Figure 1 shews a side elevation of the apparatus in the operative position.

Figure 2 shews a plan view of the same.

Figure 3 shews an isometric view on a reduced scale of the cover.

Figure 4 illustrates a section of the trumpet on the line X—Y of Figure 1.

Figure 5 shews the stylus on an enlarged scale in section.

Figure 6 shews another construction of stylus, in section through the stylus and the resonator drum to which it is attached.

In these drawings, A indicates the base plate, B the detachable cover, C the cylindrical record, D the trumpet, E the trumpet support. The base plate A may be of cast metal and supports a mechanism for giving rotary motion to the cylinder 1, on which the cylindrical record C can be slipped; the aforesaid mechanism forming in itself no part of my invention, is not specifically illustrated in the drawings, it may be of any suitable or known type. The base plate A has preferably two rear legs and one front leg arranged as shewn in dotted lines in Figure 2. One of the rear legs 2 is an ordinary cast iron leg. The other one is preferably a threaded bolt and somewhat shorter than its corresponding leg, but covered with a hollow socket 3 provided with a milled ridge or other convenient means for readily revolving it, and threaded internally to screw upon the threaded leg 2. By this means, an easy adjustment for levelling the apparatus is provided. The front leg 4 is hollow and forms a socket for the trumpet support E. This trumpet support is preferably constructed (as shewn in Figure 1 of the drawings) with a little cross pin 5 adapted to engage in a corresponding notch in the top of the hollow socket 4, thereby holding the rod or wire E firmly in place. Over the upper end of the rod E the socket 6 is arranged to fit. This socket is attached to a rim 7 of the trumpet D by means of the pivots 8. The socket 6 is attached to the trumpet D by means of the spiral spring 9 for the purpose hereinafter described.

The novelty of the construction of the trumpet resides in the arrangement for strengthening the same by the reinforcement of its lower part in the manner especially illustrated in Figure 4. The material of the trumpet which may be conveniently celluloid, or any other sufficiently light and resonant material, is curved to join at the edges into the form required, said join being in the shape of a V-shaped ridge running the entire length of the trumpet from the lower edge of the rim to the junction with the stylus. By this construction, the need of any special strengthening bars or reinforcement of other materials is obviated.

The stylus shewn in Figure 1 and sectionally in Figure 5 is formed of a curved tube terminating in a point and fitting in a wooden plug in the apex of the trumpet. Another form of stylus is shewn in section in Figure 6. It is preferably of a hard material such as glass or metal. It is formed of greater length than the stylus hitherto in use. To diminish its weight and render it more sensitive, it is formed hollow and is attached to the drum 12 by means of the annular or disc-shaped head 11. The junction of the drum or resonator 12 to the trumpet D is preferably by means of a fabric soaked in gelatine, cement or glue, but any other suitable cement may be employed.

Tourtel's Improvements in Phonographs.

The cover B is so contrived that it can be removed from the apparatus or replaced without interfering with any of the working parts. Its general construction is illustrated in Figure 3.

The end of the cylinder 1 is arranged to project slightly through the circular aperture 13 leaving a convenient space for the manipulation of the cylindrical record which can then be inserted or exchanged without moving the cover. Above the record, there is provided the slot 14 which accords access to the surface of the record for the stylus. At one side of the cover is provided the receptacle 15 having a soft pad or plug of rubber or the like at the bottom thereof, and adapted to receive the point of the stylus when the instrument is out of operation. By means of this holder, the ordinary supporting fork and other more complicated devices are rendered unnecessary. The casing is formed preferably in one piece and is secured to the base plate A by means of a single bolt 16 having a threaded end and a milled nut 17 thereon. Other apertures are provided for the insertion of the winding key 18 on the one side, and of the check screw 20 on the other.

The general operation of the phonograph is well known and need not be here described.

The record having been placed in position upon the cylinder 1, the cover B being in place and the driving mechanism started, the stylus 10 is lifted out of its receptacle 15 and put in place through the slot 14 of the cover. In addition to the weight of the trumpet D, the stylus is further impelled against the surface of the record by the action of the spiral spring 9, according to the strength of which the stylus will be more or less pressed upon the revolving record. The sounds caused by the inscriptions on the record are thus transmitted through the resonator to the trumpet and given forth. The apparatus can be easily taken to pieces for packing or removal and as easily reinstated, the cover which entirely protects the moving parts being attached to the base by only one screw.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed. I declare that what I claim is:—

1. In a phonograph: a casing covering the mechanism and record having an aperture corresponding to the end of the record through which the said record can be removed or replaced without disturbing the casing, substantially as set forth.
2. In a phonograph: a casing adapted to cover the mechanism and the record whilst allowing the record to be interchanged without disturbing the casing, said casing secured to the base of the mechanism by a single long bolt and provided with a pad or support for the stylus of the trumpet when out of contact with the record, substantially as set forth.
3. In a phonograph: the adjustable support E for the trumpet socketted in the hollow front leg of the base, substantially as set forth.
4. The combination and arrangement of parts forming the improved phonograph constructed and operating substantially as described and illustrated in the accompanying drawings

Dated the 18th day of June, 1903.

W. P. THOMPSON & Co.,
322, High Holborn, London, W.C., and
6 Lord Street, Liverpool
Patent Agents for the Applicant.

A.D. 1902. SEP. 20. N° 20,567.
TOURTEL'S COMPLETE SPECIFICATION.

(2nd Edition)

SHEET 1.

[This Drawing is a reproduction of the Original on a reduced scale]

Fig:1.

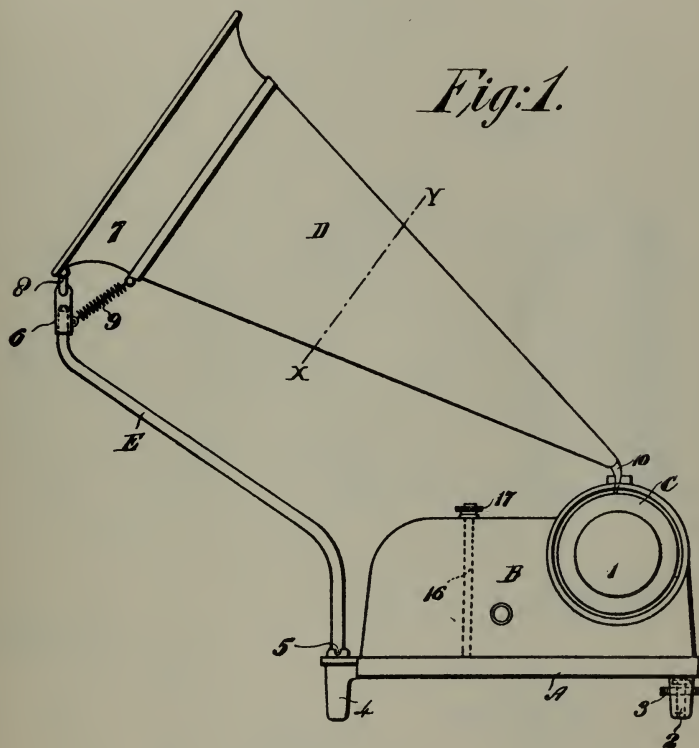
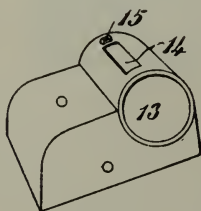
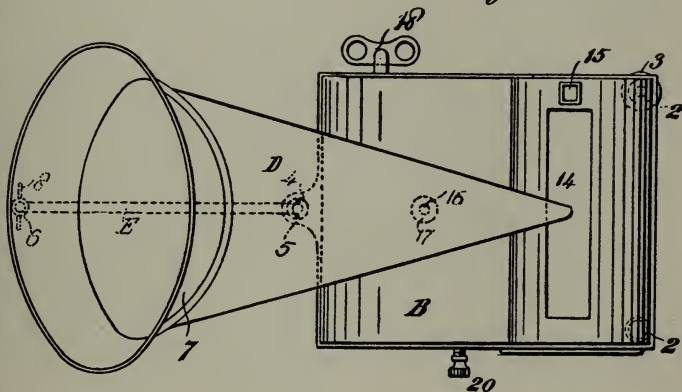
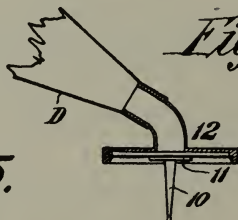


Fig. 3.*Fig. 2.**Fig. 4.**Fig. 5.**Fig. 6.*

[Second Edition.]

N^o 5186



A.D. 1903

Date of Application, 5th Mar., 1903

Complete Specification Left, 19th Nov., 1903—Accepted, 31st Dec., 1903

PROVISIONAL SPECIFICATION.

"Improvements in Trumpets for Gramophones, Phonographs and the like".

I, **FREDERICK CHARLES COCKMAN**, of 5 Curzon Road, Muswell Hill, in the County of London, Journalist, do hereby declare the nature of this invention to be as follows:—

My invention relates to trumpets for gramophones, phonographs, and the like. Heretofore such trumpets have usually been made of sheet metal and they have consequently possessed very inferior resonant qualities and in most cases a very objectionable metallic sound which obscures the qualities and characteristics of the sound of the instrument or voice whose tones are being reproduced. Sometimes papier mache trumpets have been employed, but these are dull and otherwise objectionable. I have found that by making the trumpet of wood, the qualities of the tone are greatly improved, metallic noises are avoided, distinct articulation is obtained, and minute vibrations are brought out, besides which a trumpet is obtained whose qualities improve with age.

I preferably make the trumpet from pine wood such as is used for violins, mandolins, and the like, and I find it very advantageous to cut the wood in what is technically known as "on the quarter" so that the age rings form the grain. I prefer also to reduce the thickness of the trumpet towards the large end in order to more powerfully re-inforce the vibrations of the air in the vicinity of the large end. A suitable mode of construction is to make the trumpet in sections or longitudinal taper strips glued together at their edges.

Dated this 5th day of March 1903.

D. YOUNG & Co.,
11 & 12 Southampton Buildings, London, W.C.,
Agents for the Applicant.

COMPLETE SPECIFICATION.

"Improvements in Trumpets for Gramophones, Phonographs and the like."

I, **FREDERICK CHARLES COCKMAN**, of 5 Curzon Road, Muswell Hill, in the County of London, Journalist, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

My invention relates to trumpets primarily intended for use in connection with phonographs, and gramophones, but applicable also to other sound producing instruments. Heretofore such trumpets have usually been made of sheet metal and they have consequently possessed very inferior resonant qualities and in most cases a very objectionable metallic sound which obscures the qualities and characteristics of the sound of the instrument or voice whose tones are being reproduced. Sometimes papier maché trumpets have been employed, but these are dull and otherwise objectionable. Wooden trumpets have also been used, but no attention has been paid to the construction of such trumpets

[Price 8d.]—

Cockman's Improvements in Trumpets for Gramophones, Phonographs and the like.

to bring out the musical qualities thereof, and hence the result has not hitherto been satisfactory. I have found that by making the trumpet of wood, cut as it is technically called "on the quarter", the qualities of the tones are greatly improved, metallic noises are avoided, distinct articulation is obtained, and minute vibrations are brought out, besides which a trumpet is obtained whose qualities improve with age. This construction constitutes the novel feature of my invention.

I preferably make the trumpet from pine wood such as is used for violins, mandolins, and the like. In wood cut "on the quarter" that is to say, so cut that each sheet or strip radiates from the centre of the tree or log, a straight grain or reed obtains formed by the age rings which ensure perfect vibration. I prefer to reduce the thickness of the trumpet towards the large end in order to more powerfully re-inforce the vibrations of the air in the vicinity of the large end. A suitable mode of construction is to make the trumpet in sections or longitudinal taper strips glued together at their edges.

Referring to the accompanying drawing, Figure 1 is a longitudinal central section of a conical trumpet constructed according to my invention, and Figure 2 is a transverse section taken on the line *x, x* of Figure 1.

The trumpet A is made from a number of tapering strips or sections of wood *a, a* glued together at their edges. I have shown six such strips but there may be fewer or more than six. Moreover I have shown curved strips to produce a trumpet of circular section, but they may be flat, thereby producing a trumpet with any desired number of sides. The trumpet when completed is varnished with a suitable varnish which does not set too hard and so interfere with the vibrations of the wood. I prefer that the material of the trumpet shall have gradually decreasing thickness from the neck towards the large end or mouth, in order that it may act by its own vibrations to re-inforce the vibrations of the air in the vicinity of the large end. The strips of wood forming the trumpet are as before stated cut "on the quarter" and in this way the trumpet is treated like a musical instrument.

I do not confine myself to the use of strips of wood having straight edges as shown, as in some cases the edges may be arranged spirally or circularly around the trumpet.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:

1. A trumpet built up of strips of wood cut "on the quarter" so as to obtain a straight grain, for the purpose specified.

2. A phonograph, gramophone or like trumpet constructed substantially as described and shown, for the purpose specified.

Dated this 17th day of November, 1903.

D. YOUNG & Co.,
11 & 12 Southampton Buildings, London, W.C.,
Agents for the Applicant.

(2nd Edition.)

Fig. 1.

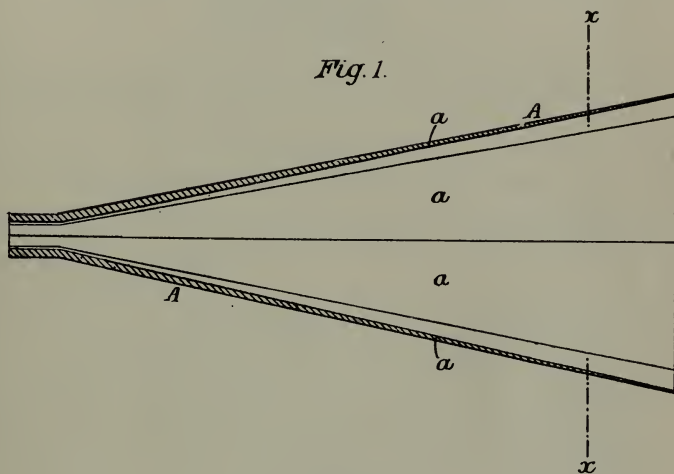
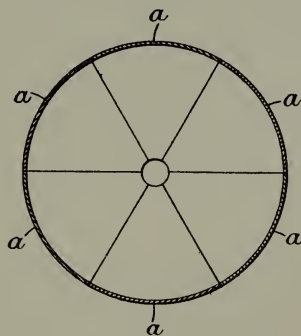


Fig. 2.



[This Drawing is a reproduction of the Original on a reduced scale.]

[Second Edition.]

N^o 14,730

A.D. 1903

Date of Application, 2nd July, 1903

Complete Specification Left, 24th Mar., 1904—Accepted, 28th Apr., 1904

PROVISIONAL SPECIFICATION.

Improvements in Phonographs and the like.

We, JOHN MESSEY TOURTEL, of Wardrobe Chambers, 146A, Queen Victoria Street, in the City of London, and GEORGE LEWIS HOGAN, of 27, Chancery Lane, in the City of London, Engineers, do hereby declare the nature of this invention to be as follows:—

- 5 Our invention relates more particularly to that class of phonographs in which the sound writing is recorded in the sides or walls of a groove which may be on a disc or cylinder of suitable material such as vulcanite, celluloid or wax, and from which such sound writings may be reproduced by transmitting vibrations corresponding to them through a stylus to a diaphragm or trumpet of a
- 10 sonorous nature by causing the groove to move or rotate in such a manner that the sound writings will be traversed by the stylus which may rest in the groove, the point of the stylus resting on the bottom of the groove of the sound writing. The difficulty arising in former types of machines of this sort is the manifestation of a grating noise due to the bottom of this groove not being perfectly
- 15 polished and smooth which necessarily imparts a vibration to the stylus. One object of our invention is to utilize the vibrations from the sound writings, and at the same time prevent the foreign or other vibrations from affecting the reproducer or sonorous mechanism. This we accomplish by providing a free flexible motion or movement of the stylus in the direction of the foreign or
- 20 objectionable vibrations such as would result from the bottom of the groove of the sound writing on an ordinary disc record, and at the same time maintaining a rigidity between the stylus point and the reproducer with respect to the sound writings or vibrations from the sides of the groove. We have obtained excellent results by forming a trumpet of celluloid provided at its larger end
- 25 with a flange and means of support so as to allow the trumpet a free lateral and vertical motion about its support, and providing the apex of the trumpet with an inner plug tapped and threaded so as to engage a threaded rod, to which rod is attached one end of a
- 30 flat flexible spring, the other end of this spring is provided with an enlargement tapped and fitted with a set screw to receive and hold the stylus, which may be a pointed steel pin, the plane of the stylus through the axis of the conical trumpet being approximately normal to the flat side of the spring. The rod of the stylus holder that screws into the trumpet is provided with a jamb nut for tightening against the block or plug in the apex of the trumpet.
- 35 The apex of the trumpet is provided with a short metal strengthening cap on the outside. The trumpet is so fixed that the seam of its joint will be on the side of the trumpet when mounted; this offers rigidity in the direction of the vibrations from the sound writings. This joint may be a crease folded joint or other suitable reinforcement.

[*Per 8d.*]

Tourtel and Hogan's Improvements in Phonographs and the like.

While we have described this mechanism for transmitting vibration from sound writings to a vibrating trumpet, it is obvious that it is equally applicable for use with a diaphragm and sound box, as the same flexibility can be provided in the stylus support in such a manner that only the sound writing vibrations will be reproduced. This may also be accomplished by the use of a stylus made of a needle-shaped piece of metal of the ordinary type of steel stylus, and flattened out in its central portion until it acts as a flexible spring to motion from the bottom of the groove of the sound writing and offers rigidity to the motions of the sound writings when the stylus is fixed so that its flat portion covers the groove of the sound writings. It is also obvious that other means besides a flexible flat spring may be provided to effect the purposes herein set forth, and in accordance with our invention we may construct in other ways than those previously described a stylus or stylus support, or both, flexible in one direction to a sufficient extent to render it useless as a conductor of sound vibrations from motion in that direction, and effective as a conductor of vibrations corresponding to sound writings from motions in another approximately normal direction.

Dated this Second day of July, 1903.

JOHN MESNÉ TOURTEL.
GEORGE LEWIS HOGAN.

COMPLETE SPECIFICATION.**Improvements in Phonographs and the like.**

We, JOHN MESNÉ TOURTEL, of Wardrobe Chambers, 146A, Queen Victoria Street, in the City of London, and GEORGE LEWIS HOGAN, of 27, Chancery Lane, in the City of London, Engineers, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

Our invention relates more particularly to that class of phonographs in which the sound writing is recorded in the side or walls of a groove which may be on a disc or cylinder of suitable material such as vulcanite, celluloid or wax, and from which such sound writings may be reproduced by transmitting vibrations corresponding to them through a stylus to a diaphragm or trumpet of sonorous nature by causing the groove to move or rotate in such a manner that the sound writings will be traversed by the stylus which may rest in the groove, the point of the stylus resting on the bottom of the groove of the sound writing. The difficulty arising in former types of machines of this sort is the manifestation of a grating noise due to the bottom of this groove not being perfectly polished and smooth which necessarily imparts a vibration to the stylus. One object of our invention is to utilise the vibrations from the sound writings, and at the same time prevent the foreign or other vibrations from affecting the reproducer or sonorous mechanism. This we accomplish by providing a free flexible motion or movement of the stylus in the direction of the foreign or objectionable vibrations such as would result from the bottom of the groove of the sound writing on an ordinary disc record, and at the same time maintaining a rigidity between the stylus point and the reproducer with respect to the sound writings or vibrations from the sides of the groove. With reference to the accompanying drawings:—

Figure 1 shows the application of our invention to a resonant trumpet,

Figures 2 and 3 illustrate its application to a reproducing needle;

Figures 4 and 5 illustrate its application to the stylus support of a gramophone sound-box,

Tourtel and Hogan's Improvements in Phonographs and the like.

Figures 6, 7 and 8 illustrate various details of the stylus holder shown in Figure 1.

Similar letters are used throughout to denominate similar parts in the various figures.

5 A is a trumpet of celluloid or other suitable resonant material provided at its larger end with a flange B having a socket C hinged at D. The trumpet has a free lateral and vertical motion about its support E. The apex of the trumpet is provided with an inner plug F tapped and threaded so as to engage a threaded rod G to which rod is attached one end of a flat flexible spring H. The other
10 end of the spring H is provided with an enlargement J tapped and fitted with a set screw K to receive and hold the stylus L, which may be a pointed steel pin, the plane of the stylus through the axis of the conical trumpet being approximately normal to the flat side of the spring. H is a piece of rubber or similar material secured above the spring H. The rod G of the stylus holder
15 that screws into the trumpet is provided with a jamb nut M for tightening against the block or plug F in the apex of the trumpet. The apex of the trumpet is provided with a short metal strengthening cap N on the outside. The trumpet is preferably so arranged that the seam of its joint will be on the side of the trumpet when mounted: this offers rigidity in the direction of
20 the vibrations from the sound writing. This joint may be a crease folded joint or other suitable reinforcement.

While we have described this mechanism for transmitting vibrations from sound writings to a vibrating trumpet, it is obvious that it is equally applicable for use with a diaphragm and sound box as the same flexibility can be provided
25 in the stylus support P (Figures 4 and 5) by thinning it at P' in such a manner that only the sound writing vibrations will be reproduced. This may also be accomplished by the use of a stylus R (Figures 2 and 3) made of a needle-shaped piece of metal of the ordinary type of steel stylus and flattened out in its central
30 portion Q until it acts as a flexible spring to motion from the bottom of the groove of the sound writing and offers rigidity to the motions of the sound writings when the stylus is fixed so that its flat portion covers the groove of the sound writings. It is also obvious that other means besides a flexible flat spring may be provided to effect the purposes herein set forth, and in accordance with
35 our invention we may construct in other ways than those previously described a stylus or stylus support or both flexible in one direction to a sufficient extent to render it useless as a conductor of sound vibrations from motion in that direction and effective as a conductor of vibrations corresponding to sound writings from motions in another approximately normal direction.

40 Having now particularly described and ascertained the nature of our said invention, and in what manuer the same is to be performed, we declare that what we claim is:—

1. The improvements in phonographs substantially as described.
2. The combination with a phonograph of a stylus or stylus holder which is flexible in one direction to a sufficient extent to render it useless as a conductor
45 of sound vibrations from motion in that direction and effective as a conductor of vibrations corresponding to sound writings from motion in another and approximately normal direction substantially as described and illustrated.

Dated this 24th day of March, 1904.

JOHN MESNY TOURTEL.
GEORGE LEWIS HOGAN.

1903. JULY 2. N^o 14,730

TOURTEL & another's COMPLETE SPECIFICATION.

(1 SHEET)

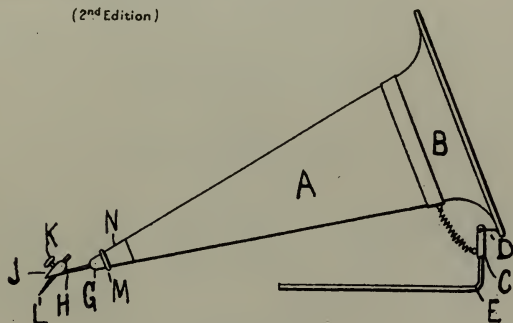
(2nd Edition)

Fig. 1.

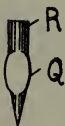


Fig. 2.

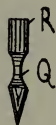


Fig. 3.

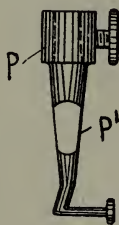


Fig. 4.

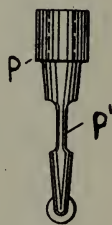


Fig. 5.

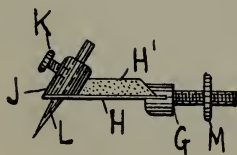


Fig. 6.



Fig. 7.

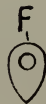


Fig. 8.

[This Drawing is a reproduction of the Original on a reduced scale.]

MEMOIRE DESCRIPTIF

annexé au Brevet d'Invention de quinze ans
pris le 23 Juin 1900

par

GUERRERO (José)

pour

“CORNET EN BOIS POUR ACCROITRE LA
VOIS ET LES SONS DES PHONO-
GRAPHES”

délivré le 9 Octobre, 1900.

No. 301583.

Notre cornet ou porte-voix phonographique est construit par des feuilles ou lames en bois très mince (un millimètre environ) découpées sous une forme convenable, juxtaposées latéralement et placées au long du cornet, dès la partie la plus étroite, ou soit l'origine du, coude *N F* (fig. 1), vers la partie plus large, soit la bouche ou cloche *N'* du cornet.

Dans la fig. 1 *A* montre les lames en bois placees en spirale et collées par leurs côtés avec de la colle forte qui forment la première couche du cornet.

O, O, montrent les lames en bois mises en sens contraire aux feuilles précédentes *A*, lesquelles constituent la seconde couche du cornet. Ces lames sont collées comme les autres par leurs côtés et collées aussi avec celles-ci, c'est-à-dire, les deux couches sont collées ensemble, mais en se croisant les fibres de leurs respectives feuilles, tel que l'indique la fig. 5.

Les figs. 2 et 3 représentent respectivement la vue latérale et la vue de face du cornet déjà fini, permettant de voir la disposition extérieure et intérieure

des plaques minces en bois qui forment notre système de cornet phonographique.

La fig. 4 montre le mode de construction du coude du cornet. *S* en est la vue de face; *D* la vue latérale, et *R R.*, le développement des pièces minces en bois qui constituent le coude. On commence pour coller par ses champs les bagues ou anneaux circulaires *P, P,* qui constituent la première couche; puis on place cette première couche avec les lames en bois *R* découpées dans la forme convenable, c'est-à dire, on place et on colle ces feuilles *R* sur les anneaux *P*, mais en recouvrant la jonction des dits anneaux et collant aussi les lames *R* par son champ dont la jonction se trouvera dans l'emplacement indiqué par les flèches. Il va sans dire que ce coude est raccordé et collé aussi au corps du cornet, tel qu'il le montre la fig. 2 du dessin ci-annexé.

EN RESUME, je revendique comme de mon exclusive propriété: un nouveau système de cornet ou porte-voix phonographique en bois pour accroître la voix et les sons des phonographes; essentiellement caractérisé:

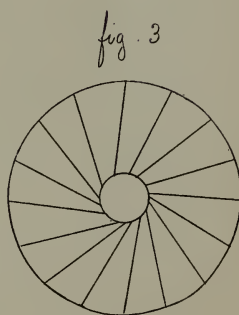
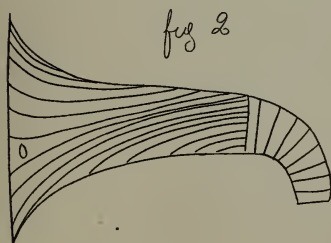
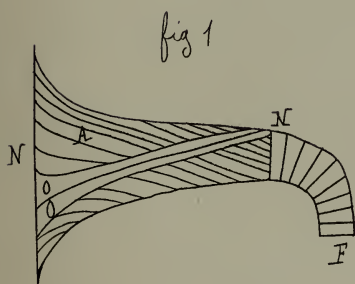
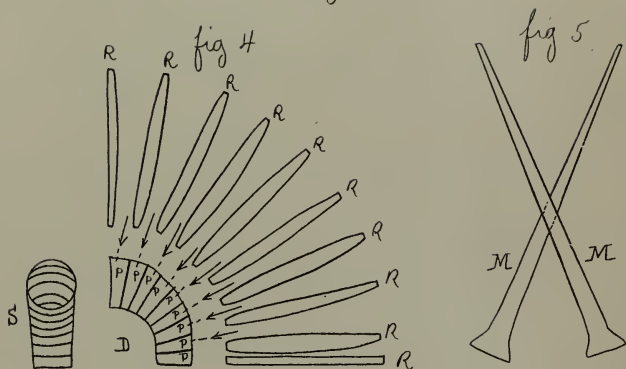
1°. Par la construction spéciale du cornet formé par deux ou plusieurs couches de lames en bois dûment collées et qui donnent l'épaisseur voulu.

2°. Par le croisement des fibres du bois que chaque couche forme avec celles de la couche précédents.

3°. Par le collage par leur champ avec de la colle forte des lames qui constituent le corps du cornet, ainsi que celui des feuilles qui en forme d'anneaux constituent le coude du dit cornet.

Je me réserve le droit de construire mon cornet en bois dans la forme et dimensions nécessaires pour son application aux phonographes de tout genre, de toute grandeur et de tout système.

Brevet Guenaro n° 301 583 du 22 juin 1900



Descriptive memoir annexed to patent of invention for 15 years, taken June 23, 1900, by Jose Guerrero, for "Horn of Wood to Increase the Voice and Sounds of Phonographs," delivered October 9, 1900.

No. 301,583.

Our horn or phonographic sound-carrier is constructed of sheets or strips of wood, very thin (about 1 millimeter), cut in a suitable form, laterally disposed and placed along the horn, from the part the most narrow, or the beginning of the elbow NF (fig. 1), towards the largest part, either the mouth or bell N of the horn.

In fig. 1, A shows strips of wood, placed spirally and glued along their sides with a strong glue, which form the first layer of the horn.

O, O, show strips of wood placed in a contrary manner upon the preceding strips A, which constitute the second layer of the horn. These strips are glued, like the others, along their sides and glued also with the latter, that is to say, the two layers are glued together, but the fibres of their respective strips cross as indicated in fig. 5.

Figs. 2 and 3 show respectively a lateral view and a front view of the finished horn, permitting to be seen the exterior and interior dispositions of the thin plates of wood forming our design of phonographic horn.

Fig. 4 shows the mode of construction of the layer of the horn. S is a front view; D a lateral view, and R, R, the unfolding of the thin pieces of wood which constitute the elbow. One commences by gluing on

their surfaces the circular or annular rings P, P, which constitute the first layer; then one assembles this first layer with the strips of wood R cut in a suitable form, that is to say, one assembles and glues these strips R upon the rings P, but in joining the said rings and gluing also the strips R upon their surface the place of union will be as indicated by the arrows. It goes without saying that this elbow is made even with and glued also to the body of the horn, as shown in fig. 2 of the drawing hereto annexed.

Summing up, I claim as my exclusive property: a new design of horn or phonographic sound-carrier of wood to increase the voice and the sounds of phonographs, characterized essentially:

1st. By the special construction of the horn formed by two or more layers of strips of wood duly glued which give the desired thickness.

2d. By the intersection of the fibres of the wood which each layer makes with those of the preceding layer.

3d. By the gluing with strong glue, upon their surface, of the strips which constitute the body of the horn, as well as that of the sheets which in the form of rings constitute the elbow of the said horn.

I reserve to myself the right to construct my horn of wood in the manner and dimensions necessary for its application to phonographs of every kind, of every size and of every design.

OFFICE NATIONAL DE LA PROPRIÉTÉ INDUSTRIELLE.

BREVET D'INVENTION

du 17 février 1902.

XII. — Instruments de précision.

N° 318742

2. — APPAREILS DE PHYSIQUE ET DE CHIMIE.

Brevet demandé le 17 février 1902 par M. TURPIN, pour un système de cornet en bois pour phonographe. (Délivré le 4 juillet 1902; publié le 25 octobre 1902.)

PRINCIPE :

Jusqu'ici les cornets des phonographes servant, soit à l'enregistrement, soit à la reproduction, sont de quatre espèces :

- 5 1° En carton;
- 2° En celluloïd;
- 3° En verre ou en cristal;
- 4° En métal : cuivre, fer-blanc, nickel, aluminium, maillechort, etc.

10 Le carton, le celluloïd ou fibroïne, ne donnent que de très mauvaises vibrations. Le cristal n'a pas eu de succès parce que les vibrations sont trop aiguës et que les cornets sont trop lourds et trop fragiles.

15 Les cornets en métal sont, en somme, les seuls employés.

Ces cornets donnent, quoi que l'on fasse, des sons métalliques nasillards qui enlèvent tout l'intérêt que pourrait avoir le phonographe en lui-même, car il est impossible de reconnaître les voix enregistrées, parce que les sons sont dénaturés. C'est ainsi que le violon ne peut être rendu convenablement par un phonographe; que les notes élevées d'une
25 bonne chanteuse légère sont dénaturées et accompagnées d'un sifflement métallique qui trouble l'ensemble, que les morceaux d'orchestre sont confus, etc.

Tous ces inconvénients qui nuisent absolument à la phonographie et qui ont empêché que le phonographe, remarquable à plus d'un point de vue, ne prenne le caractère sérieux et scientifique qu'il devrait avoir, sont dus à la

nature métallique des cornets qui transforment en une voix métallique la voix la plus pure, 35 d'abord à l'enregistrement et, ensuite, à la reproduction, d'où, finalement, une voix de polichinelle sur tous les tons et pour toutes les voix.

Comme conséquences de cet état de choses, 40 le phonographe restant un simple et souvent désagréable joujou, au lieu d'être un appareil reproduisant fidèlement les sons tels qu'il les aurait reçus, c'est-à-dire un instrument parfait permettant de reconnaître facilement les voix 45 enregistrées.

En recherchant les causes de cette grave et perturbante défectuosité, j'ai été frappé, dès le début de mes recherches, que l'on se soit ingénié, en effet, à faire passer une magnifique 50 voix de cantatrice ou de ténor, dans un cor de chasse ou dans une trompette, pour enregistrer, d'abord et, ensuite, pour reproduire les morceaux de chant. L'effet obtenu, d'une manière continue et sans désenparer, c'est-à-dire sans 55 y avoir remédié depuis l'invention du phonographe, ne pouvait rien avoir de surprenant si on étudie scientifiquement le sujet.

Il est bien évident qu'un solo de violon, de violoncelle, de hautbois ou de voix humaine, 60 étant émis dans une trompette et reproduit à l'aide d'une trompette métallique, sera complètement perdu et dénaturé par la discordance des vibrations et la cacophonie qui résultent des vibrations asynchrones qui se produisent. 65

Ce fait étant établi, par mes expériences,

Prix du fascicule : 1 franc.

j'ai recherché comment on pourrait obvier à ces défauts, et après avoir essayé différents systèmes j'ai reconnu que le bois convenablement travaillé et choisi pouvait remédier à la 5 défectuosité des phonographes actuels et rendre ces appareils parfaits. Le bois, en effet, donne des vibrations si naturelles qu'il s'accorde avec tous les instruments et surtout avec la voix humaine qu'il permet d'enregistrer et de rendre 10 avec une douceur, une netteté et une fidélité extrêmes et les nuances les plus délicates. On sait, en effet, que les instruments en bois, soit à cordes, soit à vent, sont ceux qui se rapprochent le plus de la voix humaine, tels sont le 15 violon, le violoncelle, le hautbois, etc. Le bois est donc de toutes les matières celle qui convient le mieux à la confection d'un cornet phonographique, comme je l'ai reconnu.

D'ailleurs, je ferai remarquer ici, et c'est 20 très important, au point de vue du principe, que dans l'industrie des phonographes on n'a pas l'air de se préoccuper d'obtenir des sons purs et mélodieux, mais seulement beaucoup de bruit. Du bruit, c'est à quoi visent tous les 25 cornets en fer-blanc, en aluminium, etc. On ne s'est occupé de leur forme en trompette ou en cor de chasse qu'en vue d'obtenir plus de force. Seulement au fur et à mesure que le bruit augmente, les sons nasillards et métal- 30 liques augmentent aussi et à tel point que dans un morceau d'orchestre on distingue seulement les gros instruments de cuivre tandis que tous les instruments délicats, violons, harpes, violoncelles, hautbois, etc., se confondent en 35 un sifflement désagréable et comparable à une machine qui grippe, à tel point que l'on croit, lorsque l'oreille n'y est pas faite, que c'est le mécanisme du phonographe qui en est cause.

40 Un appareil, même très ordinaire, muni d'un cornet en bois de mon système, donne un enregistrement et une reproduction très supérieurs à ceux obtenus avec des cornets métalliques.

45 Les sons émis par les instruments de cuivre, au lieu d'être exaltés comme avec un cornet métallique, sont rendus fidèlement, plutôt un peu adoucis en laissant dominer le chant.

Tels sont les principes, études et observa- 50 tions qui m'ont amené à appliquer le bois de la manière suivante, à l'industrie des phonographes.

PROCÉDÉS DE CONSTRUCTION :

Pour que les cornets en bois donnent satisfaction il faut qu'ils soient en bois très minces 55 et très secs, convenablement choisis et travaillés. Les formes convenables ainsi que la légèreté de l'appareil présentent de grandes difficultés que j'ai tournées de la manière suivante :

60

1° Cornets en bois tourné.

Ce genre de cornets, le premier qui se présente à l'esprit, est très difficile à obtenir à cause des grandes dimensions et du peu d'épaisseur nécessaires qu'il faut atteindre. En 65 outre tous les bois ne permettent pas d'arriver au résultat. L'acajou, le palissandre, l'acacia, le noyer sont chers, on les trouve difficilement en gros blocs et ils sont cassants. Le bois blanc se désagrége, le hêtre ou le tulipier d'Amérique 70 donnent les meilleurs résultats.

Pour obtenir un cornet tourné, on commence par tourner l'extérieur du bloc de bois à la forme voulue, puis on ébauche l'intérieur suivant le profil extérieur désiré. Ensuite on 75 fixe la pièce ainsi préparée à l'extérieur et ébauchée à l'intérieur, B, dans un mandrin en bois ou en métal *ad hoc* M (fig. 1), destiné à maintenir les parois du cornet, pendant que l'on finit, au tour, l'intérieur, afin d'éviter qu'il 80 se déforme et se brise sous l'effort de l'outil. Malgré ces précautions on en perd beaucoup et il y a une grande dépense de bois perdu.

Ces difficultés m'ont engagé dans une autre voie, celle d'employer du bois de placage en 8 feuilles tranchées ou sciées. Les bois ainsi préparés m'ont permis d'établir des types d'études très pratiques à l'aide des modes et moyens de construction que j'ai combinés. Les bois que j'emploie sont le palissandre, l'acajou, l'acacia, 90 le tulipier à violon, guitare, mandoline, etc., le noyer, le hêtre. Ces bois peuvent être employés seuls ou mélangés, soit par contre-placage à fils croisés, soit par assemblage de lames. Les épaisseurs peuvent varier de un 95 demi-millimètre à cinq millimètres, exceptionnellement pour les grandes dimensions.

2° Cornets en bois de placage d'une seule pièce (fig. 2, 3, 4, 5, 6 et 7).

Si on veut un cornet d'une seule pièce, on 100 trace suivant le cône désiré une développante dudit cône (fig. 2 en réduction) pour en tirer un calibre ou gabarit en métal : zinc, cuivre,

etc., qui sert ensuite à tracer les feuilles de placage que l'on superpose en grand nombre, 25, 30 ou 50, suivant l'épaisseur, et que l'on découpe à la scie à ruban ou au treuf.

5 Les pièces ainsi découpées sont plongées dans l'eau bouillante ou mieux dans une étuve à vapeur très humide et à basse pression, 1 kilogramme et demi tout au plus, pendant une heure environ. Dans ce temps le bois est devenu extrêmement mou et souple. Vivement, alors, on saisit chaque pièce découpée et ramollie, B, que l'on enroule sur elle-même, dans le sens voulu, et on l'enfile sur un moule ou forme F, analogue aux formes à pains de 15 sucre, et sur cette feuille de bois B, on applique, de suite, une autre forme F pour maintenir B, jusqu'à complet refroidissement. On superpose ainsi un plus ou moins grand nombre de feuilles de bois ramolli et de formes, 20 à volonté. Les formes doivent être chauffées dans l'eau bouillante préalablement; elles sont en métal tourné sur les deux faces qui servent toutes deux. On les prend à la main par une traverse réservée ou rivée dans le métal (fig. 3 et 4). Lorsque tout est refroidi on démoule les pièces et on procède au collage latéral C, par recouvrement à l'aide d'une colle forte de bonne qualité. On maintient le collage soit à la presse, soit sous des formes analogues aux 30 formes F, mais en toile métallique pour laisser l'air circuler et faciliter le séchage. Ensuite, après séchage on fixe le cône creux en bois ainsi obtenu dans l'embouchure métallique E, soit de préférence par collage, soit par clouure 35 (fig. 5, 6 et 7, vues en bout et en coupe de l'embouchure). Enfin on polit la pièce et on la vernit à la gomme laque, à la manière des luthiers. Le vernis augmente la sonorité et préserve le bois. On a ainsi un cornet instrumental et non pas un simple cornet conducteur du son.

3° Cornets en bois de placage en plusieurs pièces.

La figure 8 représente un cornet en bois, 45 de forme polygonale (octogone) qui est construit par lames B, clouées et collées, ou l'un ou l'autre, sur des baguettes de bois A (fig. 9 et 12, vue en bout) servant d'armature ou de carcasse. La pyramide tronquée ainsi 50 obtenue est ensuite collée en C dans une embouchure E en métal quelconque. On termine ensuite l'objet, comme il a été dit plus haut.

En place d'armatures en bois on peut faire usage d'armatures métalliques A (fig. 10, 11 et 13) pour recevoir et maintenir les feuilles 55 ou lames de bois B. Ces armatures peuvent être à l'intérieur ou à l'extérieur du cornet, lequel peut varier de formes, depuis la forme circulaire (cône) jusqu'au carré en passant par toutes les formes pyramidales à côtés multiples. 60

Les figures 14, 15 et 16 représentent un cornet, tronconique, à courbure en pavillon avec armature métallique. Une couronne repliée A forme l'armature du pavillon dans 65 laquelle s'engagent les lames de bois B; l'embouchure E porte une enveloppe isolée concentrique, mais soudée à sa base. Dans l'espace réservé entre les parois doubles ainsi formées (fig. 16), on engage et on colle le sommet du 70 cône en bois B, la base étant fixée dans la couronne de pavillon. Pour maintenir la courbure, on peut engager à l'extérieur un anneau métallique ou autre, O, relié à l'embouchure E par des tiges T soudées, collées ou rivées, en S 75 et en O. Les feuilles de placage ainsi maintenues peuvent affecter les formes désirées, en faisant varier la forme des carcasses et armatures et le tracé des lames de bois. Les joints, si besoin en est, sont fermés avec des bandes 80 de placage extrêmement minces et collées.

4° Cornets en bois combinés.

Pour obtenir une concordance des sons plus complète par synchronisme et isochronisme, on peut composer avantageusement les cornets, 85 de lames de bois d'essences diverses et même y ajouter une ou deux lames de métal et même de verre, de manière que lorsque l'on enregistrerait un morceau d'orchestre, tous les instruments trouvaient leurs harmoniques et 90 que le cornet puisse vibrer à l'unisson. Si, par exemple, le cornet est une pyramide duodécagonale, soit à 12 lames, on pourrait mettre en opposition :

- 2 lames en patissandre; 95
- 2 lames de métal qui peuvent être composées de bandes de métaux divers;
- 2 lames de verre;
- 2 lames de tulipier;
- 2 lames d'acajou rouge; 100
- 2 lames de noyer.

On obtiendrait ainsi un cornet orchestral idéal.

Pour la voix et le chant, le violon, les instruments de bois; il ne faut mettre que du bois, mais varier les espèces, ce que permet la forme polygonale de mes cornets.

- 5 On conçoit, en effet, que tous les bois ne vibrent pas également. Ainsi le noyer et le hêtre rendent très bien les sons graves; le tulipier et les bois blancs, les médiums, et l'acajou et le palissandre les notes élevées. Ces
10 différents bois se soutiennent entre eux et renforcent les sons en vibrant à l'unisson de leurs harmoniques comme les cordes d'un piano ou d'une harpe.

- 15 Tels sont les perfectionnements et procédés que j'entends breveter par les présentes.

REVENDECATIONS.

En conséquence, je revendique pour une période de quinze années :

- 20 1° L'application industrielle des bois divers à la confection spéciale des cornets pour phonographes, en conséquence des principes, études et observations et avantages particuliers que j'ai fait connaître ci-dessus et dans le but spécifié.

Notamment, la conservation du timbre de la voix ou de l'instrument;

2° Les moyens de construction desdits cornets, à l'aide du tour et mandrins, comme ci-dessus décrit et dans le but spécifié;

3° Les procédés de construction et façonnement de cornets d'une seule pièce à l'aide de bois de placage ramolli à la vapeur d'eau et de moulage et appareils et lesdits appareils, comme ci-dessus décrit et dans le but spécifié;

4° Les procédés de confection desdits cornets à l'aide de bois de placage débités en lames et fixées sur des armatures en bois ou en métal quelconque, internes ou externes, quelles qu'en soient les formes et dimensions, comme ci-dessus décrit et dans le but spécifié;

5° Les procédés de construction et de combinaison des cornets combinés, ces cornets eux-mêmes, à plusieurs bois différents, avec ou sans verre ou métaux à vibrations, comme ci-dessus décrit et dans le but spécifié.

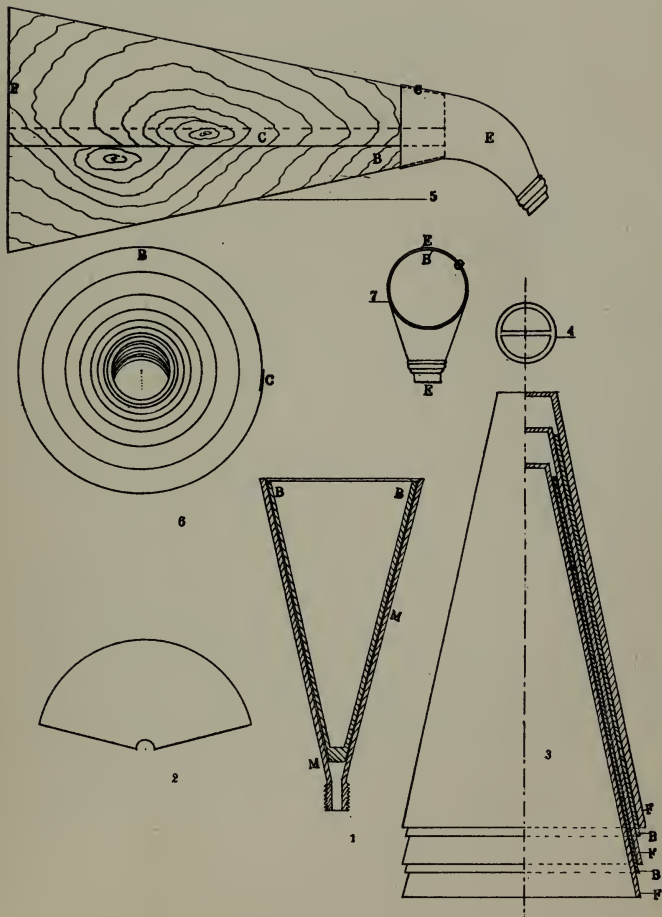
Février 1902.

Eug. TURPIN.

N° 318742

M. Turpin

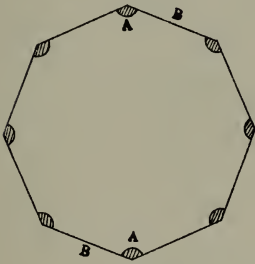
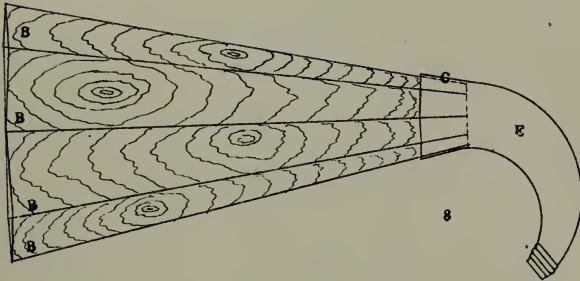
3 planches. — Pl. I



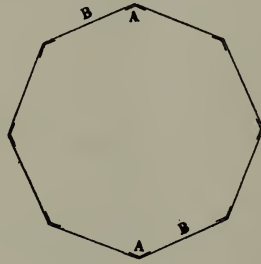
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M. Turpin

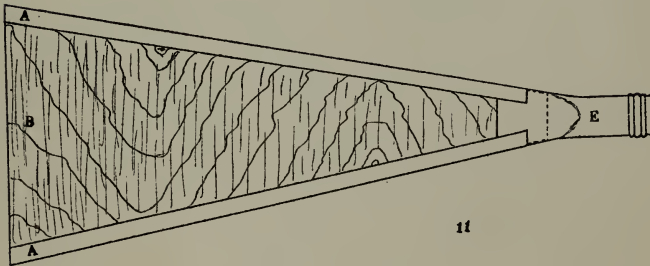
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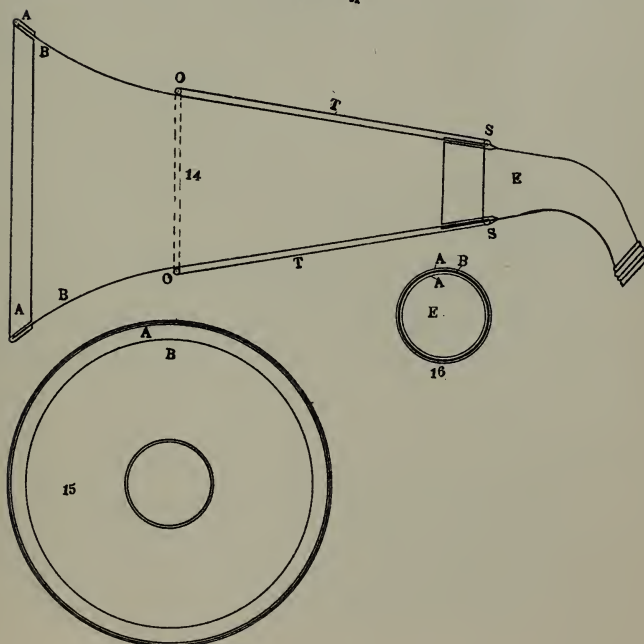
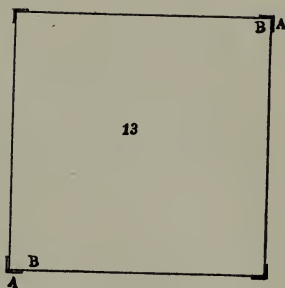
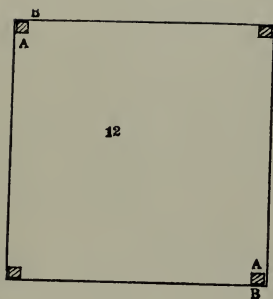


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N° 318742

M. Turpin

3 planches. — Pl. III



FRENCH REPUBLIC.

NATIONAL OFFICE OF INDUSTRIAL PROPERTY.

PATENT OF INVENTION

of February 17, 1902.

XII.—Instruments of Precision. No. 318,742

2.—Physical and chemical apparatus.

Patent applied for February 17, 1902 by M. TURPIN for a design for a horn of wood for a phonograph. (Delivered July 4, 1902; published October 25, 1902.)

PRINCIPLE.

Heretofore horns for phonographs serving either for recording or for reproduction have been of four kinds:

1st. Of pasteboard;

2nd. Of celluloid;

3d. Of glass or of crystal;

4th. Of metal; copper, tin, nickel, aluminum, german silver, etc.

Pasteboard, celluloid or fibre give only very bad vibrations. Crystal has not been successful because the vibrations are too sharp, and the horns are too heavy and too fragile.

Horns of metal are, in short, the only ones employed.

These horns give, whatever one may do, metallic, nasal sounds which take away all interest which the phonograph might have in itself, for it is impossible to recognize the recorded sounds, because the sounds are unnatural. It is thus that the violin cannot be

suitably reproduced by a phonograph; that the high notes of a good light singer are unnatural and accompanied by a metallic hissing which disturbs the ensemble that orchestral pieces are confused, etc.

All these disadvantages which absolutely harm the phonograph and which have prevented the phonograph, which is remarkable from more than one point of view, from acquiring the serious and scientific character which it ought to have, are due to the metallic nature of the horns which transform into a metallic sound a sound the most pure, first in the recording and then in the reproduction, whence finally into a sound of mockery for all tones and for all sounds.

As a consequence of this state of things, the phonograph remains a simple and often disagreeable toy, instead of being an apparatus faithfully reproducing sounds such as it may have received, that is to say a perfect instrument permitting easy recognition of the recorded sounds.

In searching for the causes of this serious and disturbing defectiveness, I have been surprised from the beginning of my researches, that one may try in vain, to cause a magnificent voice of a singer or tenor to pass to a hunting horn or in a trumpet first for the recording and then for the reproducing of the pieces of song. The effect obtained, in a manner continued and without change, that is to say without having remedied it since the invention of the phonograph can have nothing of surprise if one studies the subject scientifically.

It is very evident that a solo of a violin, of a violon-

cello, of an oboe or of the human voice, being emitted into a trumpet and reproduced by the aid of a metallic trumpet, will be completely lost and rendered unnatural by the discord of the vibrations and want of harmony which result from the asynchronous vibrations which are produced.

This fact being established by my experiences, I have sought how one could obviate these defects, and after having tried different plans I have observed that wood suitably worked and selected can remedy the defectiveness of the present phonographs and render these instruments perfect. Wood, indeed, gives vibrations so natural that it accords with all instruments and above all with the human voice which it permits to be recorded and to be reproduced with a softness, a clearness and an extreme fidelity and the most delicate shades. One knows, indeed, that instruments of wood, whether string instruments or wind instruments, are those which approach the most to the human voice. Such are the violin, the violoncello, the oboe, etc. Wood is then of all materials that which conforms the best to the composition of a phonographic horn, as I have observed.

In addition, I would remark here, and it is very important, from the point of view of the principle, that in the phonograph industry one does not pretend to attempt to obtain sounds pure and melodious, but only much noise. Noise, that is what all horns of tin, of aluminum, etc., aim at. One is concerned with their form, as a trumpet or hunting horn, only with a view of obtaining more force. Only in proportion

as the noise increases do the nasal and metallic sounds also increase and to such a point that in an orchestral piece one distinguishes only the large instruments of copper while all the delicate instruments, violins, harps, violoncellos, oboes, etc., are confused in a hissing that is disagreeable and comparable to a machine that catches, to such a point that one thinks, when the ear is not accustomed to it, that it is the mechanism of the phonograph which is the cause of it.

An apparatus, even very ordinary, provided with a horn of wood of my design, gives a recording and a reproduction very superior to those obtained with metallic horns.

The sounds emitted by instruments of copper, instead of being elevated as with a metallic horn, are rendered faithfully, rather a little softened, permitting the song to dominate.

Such are the principles, studies and observations which have led me to apply wood in the following manner to the phonograph industry.

PROCESS OF CONSTRUCTION.

In order that horns of wood may give satisfaction it is necessary that they be of wood very thin and very dry, suitably selected and worked. The suitable forms as well as the lightness of the apparatus present great difficulties which I have resolved in the following manner;

1st. Horns turned in wood.

This kind of horns, the first which presents itself to the mind is very difficult to obtain because of the large dimensions and of the small thickness which

it is necessary to attain. Besides all woods do not permit of obtaining the result. Mahogany, rosewood, acacia and walnut are dear, one finds them difficult in large blocks and they are fragile. White wood disintegrates, the beech or the tulip of America gives the best results.

In order to obtain a turned horn, one begins by turning the exterior of the block of wood to the form desired, then one fashions the interior following the exterior outline desired. Then one fixes the piece B, thus prepared on the exterior and fashioned on the interior, in a mandrel M (fig. 1) of wood or of metal for this purpose, intended to maintain the walls of the horn while one finishes it in turn on the interior, in order to avoid deformation and breaking under the effort of the tools. Notwithstanding these precautions one loses many of them and there is a great expense for wood lost.

These difficulties engaged me in another way, that of employing wood for veneering cut or sawed into sheets. Woods thus prepared have permitted me to construct types for study very practical by the aid of methods and means of construction which I have combined. The woods which I employ are rosewood, mahogany, acacia, tulip used for the violin, guitar, mandolin, etc., walnut and beech. These woods can be employed alone or mixed either by counter-veneering in cross order or by the assemblage of strips. The thickness may vary from a one-half mm. to 5mm. used exceptionally for large dimensions.

2nd. Horns of wood for veneering in a single piece (fig. 2, 3, 4, 5, 6, and 7).

If one wishes a horn of one piece, one spreads out according to the cone desired, an unfolded pattern of the cone (fig. 2 on a small scale) in order to obtain therefrom a caliber or model in metal, zinc, copper, etc., which then serves for outlining the sheets for veneering which one superimposes in great number, 25, 30 or 50, according to the thickness, and which one cuts out with a ribbon or other saw.

The pieces thus cut out are immersed in boiling water or rather in a steam-oven very humid and of low pressure, one kilogram and a half in all at the most, for about an hour. During this time the wood becomes extremely soft and supple. Quickly then one takes each cut and softened piece, B, which one folds upon itself, in the manner desired, and one places it on a mold or form F similar to forms for sugar-bread, and upon this sheet of wood B one applies then another form F in order to maintain B until complete cooling. One super-imposes thus a more or less large number of sheets of softened wood and of forms as desired. The forms should be heated in boiling water, preferably; they are of metal turned upon the two faces both of which are used. One takes them in the hand by a cross piece left or riveted in the metal (fig. 3 and 4). When all is cold one takes the pieces from the molds and proceeds to the lateral joint C securing it by means of a strong glue of good quality. One maintains the joint either by pressure or under forms similar to forms F, but of metal cloth in order to let the air circulate and to facilitate the drying. Then after the drying one secures the hollow cone of wood thus obtained in the

metallic mouth-piece E, either preferably by gluing or by nailing (fig. 5, 6 and 7, end and fore-shortened views of the mouth-piece). Finally one polishes the piece and varnishes it with a shellac, in the manner employed by instrument makers. The varnish increases the sonorousness and preserves the wood. One has then an instrumental horn and not a simple horn, that is a conductor of sound.

3rd. Horns of wood for veneering in several pieces.

Figure 8 represents a horn of wood, of polygonal form (octagonal) which is constructed of strips B, nailed and glued, or one or the other, upon ribs of wood A (figs. 9 and 12, end views) serving as bracers or as a skeleton. The truncated pyramid thus obtained is then glued at C in a mouth-piece E of any metal. One then finishes the matter in the manner which has been set forth above.

In place of ribs of wood one can make use of metallic ribs (figs. 10, 11 and 13) to receive and maintain the sheets or strips of wood B. These ribs may be on the interior or on the exterior of the horn, which may vary in form, from the circular form (cone) to that of a square, passing through all the pyramidal forms having a plurality of sides.

Figures 14, 15 and 16 show a truncated bell-shaped horn, with metallic bracing. A folded ring A forms the bracing of the bell in which the strips of wood B are engaged; the mouth-piece E carries a concentric envelope, detached but soldered at its base. In the space reserved between the double walls thus formed (fig. 16), the top of the cone of wood B is engaged and glued, the base being secured in the bell ring.

To maintain the curvature, one may secure to the exterior a metallic or other ring O, connected to the mouthpiece E by rods T, soldered, glued or riveted at S and at O. The sheets of veneering, thus maintained, can effect the forms desired, by varying the form of the skeleton and ribs and shape of the sheets of wood. The joints, if there is need of it, are secured by bands of veneering wood very thin and glued.

4th. Horns of woods combined.

In order to obtain a more complete concordance of the sounds by synchronism or isochronism, one may advantageously construct the horns of strips of wood of different kinds and also add thereto one or two strips of metal and also of glass, so that when one records an orchestral piece, all the instruments find their harmonics and that the horn can vibrate in unison. If, for example, the horn is a duo-decagonal pyramid, that is with 12 strips, one may put in opposition:

2 strips of rosewood;

2 strips of metal which may be composed of bands of different metals;

2 strips of glass;

2 strips of tulip;

2 strips of red mahogany;

2 strips of walnut.

One obtains thus an ideal orchestral horn.

For the voice and the song, the violin, the instruments of wood, it is necessary not only to employ wood, but to vary the kinds, which the polygonal form of my horns permits.

One understands, indeed, that all the woods do not vibrate equally. Thus the walnut and the beech render very well the grave sounds; the tulip and the white woods, the medium, and the mahogany and the rosewood the high notes. These different woods keep up among them and reinforce the sounds in vibrating in unison with their harmonics like the strings of a piano or of a harp.

Such are the results and methods which I intend to patent by these presents.

CLAIMS.

Therefore, I claim for a period of fifteen years;

1st. The industrial application of different woods to the special construction of horns for phonographs, according to the principles, studies and observations and particular advantages which I have set forth above and finally specified.

Especially the conservation of the quality of the voice and of the instrument.

2nd. The means of construction of said terms, by the use of a turning lathe and mandrels, as above described and finally specified.

3rd. The methods of construction and fashioning of horns in a single piece by the use of wood for veneering softened by steam and of molding and bracing and said apparatus, as above described and finally specified.

4th. The methods of construction of said horns by the use of wood for veneering cut into strips and secured upon ribs of wood or of any metal, internally or externally whatever may be their forms

and dimensions, as described above and finally specified.

5th. The methods of construction and the combination of combined horns, those horns of several different woods, with or without vibrating glass or metals, as above described and finally specified.

February, 1902.

EUG. TURPIN.

RÉPUBLIQUE FRANÇAISE.

OFFICE NATIONAL DE LA PROPRIÉTÉ INDUSTRIELLE.

BREVET D'INVENTION

du 28 mai 1902.

XII. — Instruments de précision.

2. — APPAREILS DE PHYSIQUE ET DE CHIMIE.

N° 321.507

Brevet de quinze ans demandé le 28 mai 1902 par M. RUNGE (Walter C.), pour perfectionnements dans les cornets de graphophones ou machines parlantes. (Délivré le 12 septembre 1902; publié le 12 janvier 1903.)

Cette invention concerne les cornets de graphophones ou machines parlantes et a pour objet principal la fabrication d'un cornet qui ait des qualités de sonorité perfectionnée:

5 L'invention comprend aussi des supports perfectionnés pour le cornet, de telle sorte qu'en marche le style ou la pointe soit pressé avec une légère pression élastique sur la surface enregistreuse, et puisse, quand il est
10 nécessaire, être facilement mis hors de contact avec elle sans risquer d'endommager ladite surface.

Dans le dessin annexé; qui représente un graphophone et une forme d'exécution de
15 cornets et de supports de cornet suivant cette invention.

La figure 1 est une vue perspective avec une partie du cornet arrachée pour montrer sa forme en coupe transversale, et

20 La figure 2 montre également en perspective la plus petite extrémité du cornet dans la position qu'elle occupe quand elle n'est pas en fonction.

En se reportant d'abord à la figure 1,
25 A est un socle creux adapté pour recevoir un moteur destiné à actionner l'instrument, lequel peut être fixé sur le dessous d'une platine B et consiste de préférence en un mouvement d'horlogerie actionné par un ressort qui peut
30 se remonter par la clef C, le mécanisme étant mis en marche et arrêté au moyen d'une tête moletée B'. Les détails du moteur ne font pas

partie de la présente invention et par conséquent ne sont pas décrits.

Le cylindre enregistreur D montré en lignes 35 ponctuées dans la figure 1 est monté sur un mandrin D' qui peut tourner autour d'une tige D² maintenue dans le montant D³ fixé à la platine B. Ce mandrin est actionné par une courroie croisée E au moyen d'une poulie F 40 fixée à un axe F' s'élevant à travers la platine ou embase B et venant du moteur. Le cornet G est fait d'une feuille de matière flexible telle que du celluloid, ses bords étant assemblés par une pince métallique G' qui forme un 45 renfort longitudinal le long d'un côté de cette feuille et est fixé par la petite extrémité à une bande G² entourant le cornet et portant une pointe ou style G³ dans une douille G⁴. Un autre renfort est disposé de préférence à l'ex- 50 trémité opposée du cornet et ce second renfort affecte de préférence la forme d'un pli G⁵ qui, tout en renforçant le cornet, lui donne une forme en section transversale à peu près semblable à celle montrée dans la figure. 55

Afin que le cornet perfectionné puisse s'employer avec un pavillon évasé de la forme ordinaire, ce pli ne se prolonge pas, de préférence, jusqu'à l'extrémité large du cornet qui s'ajuste ainsi facilement dans le pavillon 60 évasé G⁶.

Le second renfort, au lieu d'être en forme de pli, peut affecter la forme d'une pince ou bande métallique fixée sur l'extérieur ou l'inté-

Prix du fascicule : 1 franc.

rieur du cornet et on peut employer plus de deux renforts.

Le cornet G est monté à pivot à sa plus large extrémité par une tige courbe H qui s'ajuste dans une douille H' sur le socle A , sa position précise étant déterminée par des fentes H^2 dans la douille qui reçoivent des broches H^3 sur la tige H . Le cornet est muni d'une plaque J ayant deux pattes ou tenons courbés vers le bas J' dans lesquels est monté à pivot un axe J^2 . Cet axe porte une douille J^3 appropriée pour passer par-dessus et tourner facilement sur l'extrémité relevée de la tige H . Un ressort plat J^4 se trouve à la partie supérieure de la douille J^3 et est muni d'un tampon J^5 à son extrémité libre où il presse contre le pavillon évasé G^6 du cornet.

La forme du ressort J^4 est telle que, quand l'instrument est dans sa position de travail comme on le voit dans la figure 1, le ressort presse contre l'extrémité évasée G^6 et fait appuyer la pointe G^5 avec une légère pression élastique sur le cylindre enregistreur D . On trouve que ce dispositif donne de bons résultats en pratique parce qu'il obvie à la tendance qu'a la pointe à quitter les rainures quand l'instrument est ébranlé ou dérangé.

Une barre ou pontet pivotant K se trouve près du cylindre enregistreur D et sous la petite extrémité du cornet G . Ce pontet est de préférence fait en fil métallique léger courbé de façon à ce qu'il puisse tourner autour d'un autre fil métallique horizontal K' supporté par une tige K^2 qui s'ajuste dans une douille H^4 faisant partie de la douille H' . Normalement, cette barre ou pontet K est, comme il est montré dans la figure 1, abattue de manière à être hors de contact avec le cornet G , mais quand on veut mettre l'instrument hors d'action on le tourne pour l'amener à une position verticale comme on le voit dans la figure 2 et il soulève l'extrémité inférieure du cornet et la pointe ou style, en les écartant du cylindre enregistreur. On trouve que ce dispositif éleveur simple est, à l'usage, celui qui procure un moyen rapide et sûr de mettre la pointe verticalement hors de prise avec les rainures

sur le cylindre enregistreur. Si cette action est produite comme avec d'autres instruments, en soulevant le cornet à la main et en le mettant au repos, il y a danger de déplacer la pointe légèrement de côté le long du cylindre enregistreur en endommageant ainsi les rainures.

On doit comprendre que le cornet et les supports de cornet d'après cette invention peuvent s'employer de concert avec toute forme convenable quelconque de graphophones ou machines parlantes, et ne sont pas limités au genre particulier d'instrument décrit dans le présent mémoire à titre d'exemple.

En résumé, ayant maintenant décrit en détail et fait connaître la nature de ladite invention et de quelle manière on doit la réaliser, je revendique :

1° Dans un graphophone ou machine parlante, un cornet ayant deux ou plusieurs renforts longitudinaux servant à perfectionner ses qualités de sonorité.

2° Dans un graphophone ou machine parlante, un cornet ayant une pince G' assemblant les bords de la feuille de matière dont le cornet est fabriqué et servant de renfort, et un autre renfort en forme de pli longitudinal G^5 dans le côté opposé du cornet.

3° Dans un graphophone ou machine parlante, la combinaison avec un cornet pivotant d'un support à ressort tel que J^4 pour faire appuyer le style ou pointe avec une légère pression élastique dans les rainures du cylindre enregistreur.

4° Dans un graphophone ou machine parlante, la combinaison avec un cornet d'un dispositif éleveur tel que K , K' , en principe de la manière et pour la destination décrites.

5° Dans un graphophone ou machine parlante, la combinaison avec un cornet ayant deux ou plusieurs renforts longitudinaux d'un dispositif éleveur K , K' et d'un support à ressort en principe comme il a été décrit et représenté dans le dessin annexé.

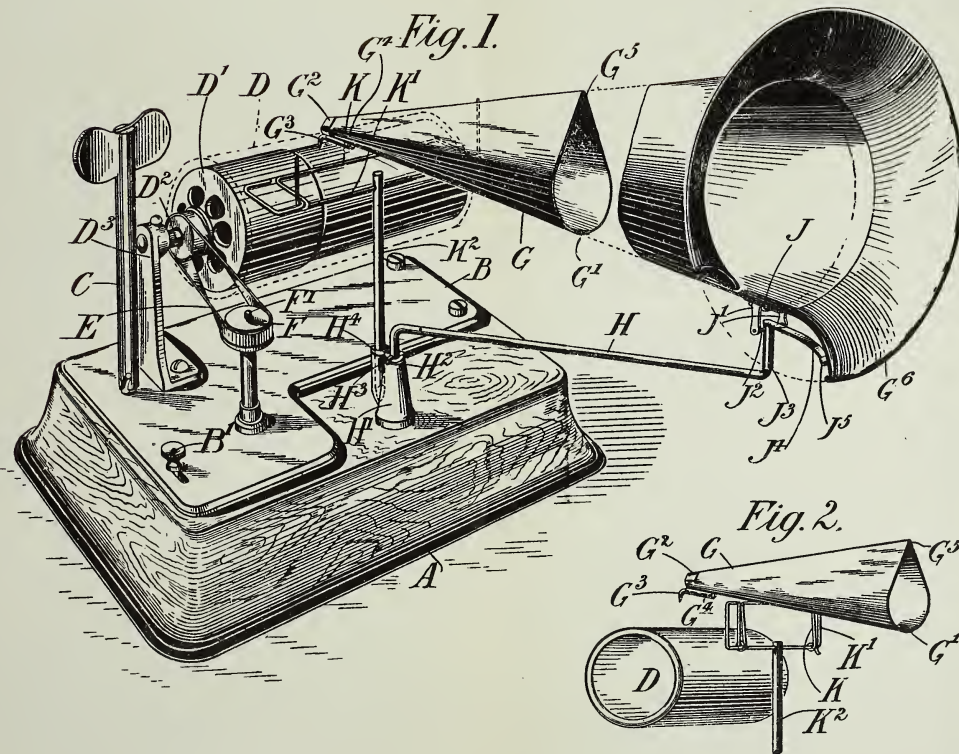
Paris, le 28 mai 1902.

Par procuration de M. W.-G. Rungius.
Ch. THIRION et J. BONNET.

N° 321.507

M. Runge

Pl. unique



FRENCH REPUBLIC.

NATIONAL OFFICE OF INDUSTRIAL
PROPERTY.

PATENT OF INVENTION.

Of May 28, 1902.

XII—Instruments of precision. No. 321,507.

2—Physical and chemical apparatus.

Patent for 15 years, applied for May 28, 1902, by
M. Runge (Walter C.), for improvements in
horns for graphophones or talking machines
(Delivered Sept. 12, 1902; published January
12, 1903).

This invention relates to horns for graphophones
or talking machines and has for its principal object
the manufacture of a horn which has improved
sound-producing qualities.

The invention comprises also improved supports
for the horn, of such kind that in operation the stylus
or point may be pressed with a light elastic pressure
upon the record surface, and then, when necessary,
be easily put out of contact with it without risk of
damaging said surface.

In the annexed drawing, which represents a
graphophone and one form of construction of horns
and of supports for horns according to this inven-
tion;—

Figure 1 is a perspective view with a part of the
horn removed in order to show its form in transverse
section, and

Figure 2 shows likewise, in perspective, the smaller
end of the horn in the position which it occupies when
it is not in use.

Referring first to figure 1, A is a hollow pedestal adapted to receive a motor designed to actuate the instrument, which can be secured upon the under surface of a platen B and consists, preferably, of a clock movement actuated by a spring which can be wound up by a key C, the mechanism being put in operation and stopped by means of a milled head B.' The details of the motor do not form part of the present invention and consequently are not described.

The cylinder for recording D shown in dotted lines in figure 1 is mounted upon a mandrel D' which turns about a shaft D² mounted in the standard D³ fixed to the platen B. This mandrel is actuated by a twisted leather strap E by means of a pulley F secured to an axel F' rising through the platen or base B and proceeding from the motor. The horn G is made of flexible sheet material such as celluloid its edges being joined together by a metallic clip G' which forms a longitudinal reinforcement along the side of this sheet and is connected at the smaller end to a band G² surrounding the horn and carrying a point or stylus G³ in a socket G⁴. Another reinforcement is placed preferably at the opposite side of the horn and this second reinforcement takes preferably the form of a crease G⁵ which, while reinforcing the horn, gives to it a form in cross-section about like that shown in the drawing.

In order that the improved horn may be employed with a flaring bell of the ordinary form, this crease is not prolonged, preferably, to the large end of the horn, which thus fits easily in the flaring bell G⁶.

The second reinforcement, instead of being in the form of a crease can take the form of a clip or metal strip fixed upon the exterior or the interior of the horn and one can employ more than two reinforcements.

The horn G is pivotally mounted at its larger end by a curved rod H which fits into a socket H' upon the pedestal A, its precise position being determined by perforations H² in the socket, which receive pins H³ upon the rod H. The horn is provided with a metal piece J having two downwardly curved hands or ends J' in which is pivotally mounted an axis J². This axis carries a socket J³ adapted to receive and turn easily upon the upwardly extending extremity of the rod H. A flat spring J⁴ is secured to the upper part of the socket J³ and is provided with a pad J⁵ at its free end where it presses against the flaring bell G⁶ of the horn.

The form of the spring J⁴ is such that when the instrument is in its position of operation, as one sees it in figure 1, the spring presses against the flaring end G⁶ and causes the point G³ to bear with a light elastic pressure upon the recording cylinder D. One finds that this disposition gives good results in practice because it obviates the tendency which the point has of leaving the grooves when the instrument is shaken or disturbed.

A pivoted bar or bridge K is placed near the recording cylinder D and under the small end of the horn G. This bridge is preferably made of light metal wire curved in such manner that it can be turned about another horizontal metal wire K' sup-

ported by a rod K^2 which is adjusted in a socket H^4 forming part of the socket H' . Normally, this bar or bridge K is, as shown in figure 1, lowered so as to be out of contact with the horn G , but when one wishes to put the instrument out of action one turns it in order to bring it to a vertical position as seen in figure 2 and it raises the lower end of the horn and the point or stylus, separating them from the recording cylinder. One finds that this simple lifting adjustment is, in practice, one that secures a rapid and sure means of raising the point out of contact with the grooves of the recording cylinder. If this action is produced as with other instruments, in raising the horn by the hand and in putting it at rest, there is danger of moving the point lightly to the side along the recording cylinder thus damaging its grooves.

One should understand that the horn and the supports for the horn, according to this invention, can be employed together with every suitable form of graphophones or talking machines, and are not limited to the particular kind of instrument described in the present memorandum by way of example.

Summing up, having now described in detail and made known the nature of said invention and in what manner it is to be performed, I claim:

1st. In a graphophone or talking machine, a horn having two or more longitudinal reinforcements serving to improve its sound-producing qualities.

2nd. In a graphophone or talking machine, a horn having a slip G' joining together the edges of the sheet material of which the horn is made and serv-

ing as a reinforcement and another reinforcement in the form of a longitudinal crease G^5 at the opposite side of the horn.

3rd. In a graphophone or talking machine, the combination with a pivoted horn of a spring support such as J^4 to cause the stylus or point to bear with a light elastic pressure in the grooves of the recording cylinder.

4th. In a graphophone or talking machine, the combination with a horn of an elevating device such as K , K' , substantially in the manner and for the purpose described.

5th. In a graphophone or talking machine, the combination with a horn having two or more longitudinal reinforcements of an elevating device K , K' , and of a spring support J^4 substantially as described and shown in the annexed drawing.

Paris, May 28, 1902.

By power of attorney of
M. W. C. RUNGE,
CH. THIRION and
J. BONNET.

RÉPUBLIQUE FRANÇAISE.

OFFICE NATIONAL DE LA PROPRIÉTÉ INDUSTRIELLE.

BREVET D'INVENTION

du 28 avril 1903

XII. — Instruments de précision.

2. — APPAREILS DE PHYSIQUE ET DE CHIMIE.

N° 331.566

Brevet de quinze ans demandé le 28 avril 1903 par M. William Turner Pierce
HOLLINGSWORTH résidant en France.

Système de cornet pour phonographes et autres instruments analogues.

Délivré le 31 juillet 1903; publié le 19 septembre 1903.

Ce système de cornet est établi de façon à présenter deux parties à peu près planes, disposées sous un certain angle l'une par rapport à l'autre et unies par une partie 5 intermédiaire très flexible faisant pour ainsi dire fonction de charnière et s'étendant dans le sens de la longueur du cornet.

A l'exception de ces deux parties planes, le cornet est de section concavo-convexe et la 10 partie intermédiaire peut être rendue flexible non seulement en donnant au pli une assez grande ouverture, mais en perçant des ouvertures à des intervalles réguliers le long du pli formé. Il y a avantage, dans la plupart des 15 cas, sinon dans tous, à établir, en regard de la partie intermédiaire formant charnière, une zone longitudinale présentant une grande rigidité.

Dans le dessin ci-joint, la fig. 1, en perspective, représente un cornet établi suivant ce système.

La fig. 2 est une coupe suivant 2, 2 fig. 1.

La fig. 3 est une coupe suivant 3, 3 fig. 1.

La fig. 4 est une vue semblable à la fig. 1, 25 sauf qu'elle représente une variante.

La fig. 5 est une coupe suivant 5, 5 fig. 4.

Le cornet peut être en matière quelconque, mais on donnera la préférence au celluloïd. Il est conique d'un bout à l'autre et son gros 30 bout peut être de section à peu près circulaire, fig. 2, celle-ci s'appliquant à la fois aux

deux dispositions des figures 1 et 4. Le petit bout peut, lui aussi, être de section ronde ou diamantiforme.

Il est établi avec deux parties planes, a' a^2 , 35 qui, à leurs bords adjacents, sont réunies par une partie intermédiaire très flexible a^3 formant charnière. Cette dernière peut s'obtenir avantageusement en formant un large pli dans la matière dont se compose le cornet. Par 40 large pli, il faut entendre un pli qui donne le minimum de raideur et le maximum de flexibilité à cette partie du cornet dans laquelle le pli est formé et ce à l'effet de donner aux parties planes a' a^2 la plus grande faculté 45 possible de vibrer l'une par rapport à l'autre.

Une flexibilité suffisante peut s'obtenir par la disposition représentée aux figures 1, 2 et 3, pourvu que le pli soit suffisamment large et fléchissant. On peut aussi assurer la 50 flexibilité voulue en perçant des trous ou des ouvertures a^4 le long du sommet du pli, ainsi que le représentent les figures 4 et 5. Bien que ces ouvertures puissent avoir des formes différentes, il y a lieu d'estimer que la forme 55 la plus avantageuse est celle des figures 4 et 5, dans laquelle elles sont constituées par des fentes s'étendant dans le sens longitudinal du pli.

De la raideur en regard du pli a^3 est, de 60 l'avis de l'inventeur, avantageuse lorsqu'on se sert, pour la confection du cornet, d'une ma-

Prix du fascicule : 1 franc.

tière telle que le celluloïd. On peut obtenir cette raideur en assujettissant au cornet, en regard du pli a^3 , une bande de tôle a^5 , à chaque bord du celluloïd. Lorsqu'on fait usage
 5 de ces bandes, on peut les utiliser comme moyen pour assembler les deux bords d'une plaque de matière que l'on courbe à la forme voulue pour établir le cornet. En tous les cas, on peut se servir d'un mastic convenable pour
 10 fixer les bandes à la matière. Lorsqu'on se sert de celluloïd, l'une quelconque des colles ou compositions bien connues peuvent être employées pour le réunir au métal.

Au petit bout du cornet est fixé le style a^6 ,

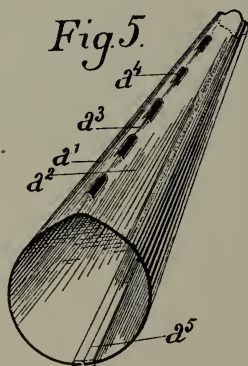
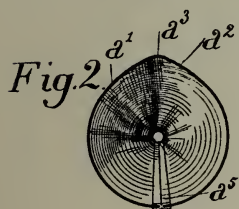
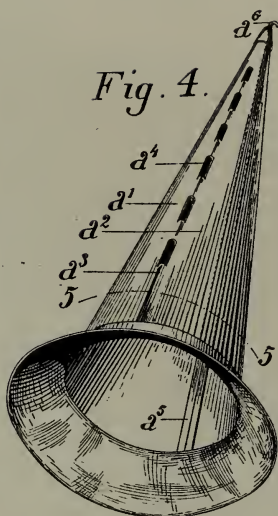
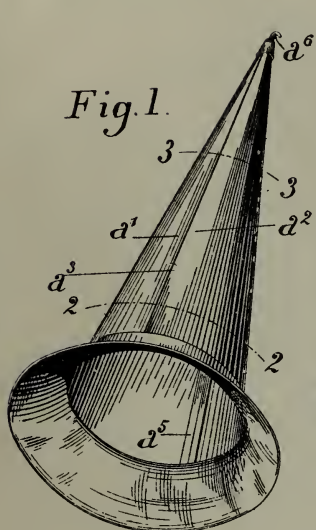
le montage de celui-ci pouvant être effectué à 15 l'aide des bandes a^5 .

Les extrémités du cornet peuvent être garnies d'anneaux ou de garnitures métalliques servant à les protéger contre toute fracture accidentelle. 20

Un cornet de ce système peut être monté et manœuvré de n'importe quelle manière convenable pendant l'usage. Ce sont là des détails qui sont en dehors du cadre de la présente demande. 25

Par procuration de : HOLLINGSWORTH.

BRANDON frères.



FRENCH REPUBLIC.

NATIONAL OFFICE OF INDUSTRIAL
PROPERTY.

PATENT OF INVENTION.

Of April 28, 1903.

XII—Instruments of precision. No. 331,566.

2—Physical and chemical apparatus.

Patent for 15 years, applied for April 28, 1903, by
M. William Turner Pierce Hollingsworth resid-
ing in France. Design of horn for phonographs
and other like instruments. Delivered July 31,
1903; published Sept. 19, 1903.

This design of horn is constructed in such a way
as to present two parts nearly flat, disposed at a cer-
tain angle with respect to each other and united by
a very flexible intermediate part performing, so to
speak, the function of a hinge and extending along
the length of the horn.

With the exception of these two flat parts, the horn
is in section concavo-convex and the intermediate
part can be rendered flexible not only by giving to
the crease a sufficiently large opening, but by mak-
ing openings at regular intervals along the crease.
It is advantageous, in most cases, but not in all, to
make, with respect to the intermediate part forming
the hinge, a longitudinal zone of great rigidity.

In the drawing hereto annexed, fig. 1 shows, in per-
spective, a horn constructed according to this design.

Fig. 2 is a section upon the line 2—2 of fig. 1.

Fig. 3 is a section upon the line 3—3 of fig. 1.

Fig. 4 is a view similar to fig. 1, except that it shows
a modification.

Fig. 5 is a section upon the line 5—5 of fig. 4.

The horn can be of any material, but preference will be given to celluloid. It is conical from one end to the other and its large end can be of a section nearly circular, fig. 2, the latter figure applying at the same time to the two arrangements of figures 1 and 4. The small end can also be of round or diamond section.

It is constructed with two flat parts, a' , a^2 , which at their adjacent edges, are united by a very flexible intermediate part a^3 , forming a hinge. This can be attained advantageously by forming a wide crease in the material of which the horn is composed. By a wide crease, is to be understood a crease which gives the minimum stiffness and the maximum of flexibility to that part of the horn in which the crease is formed and this has the effect of giving to the flat parts, a' a^2 the greatest possible capacity of vibrating in conformity with each other.

A sufficient flexibility can be obtained by the arrangement shown in figures 1, 2 and 3, provided that the crease be sufficiently wide and pliant. The desired flexibility can also be secured by making holes or openings a^4 along the top of the crease, as shown in figures 4 and 5. Although these openings can have different forms, there is reason to believe that the most advantageous form is that of figures 4 and 5, in which they consist of openings extending longitudinally along the crease.

With regard to the crease a^3 some stiffness is, in the opinion of the inventor, advantageous when one uses, for the making of the horn, a material such as

celluloid. One can obtain this stiffness by securing to the horn, with reference to the crease a^3 , a strip of metal a^5 at each edge of the celluloid. When use is made of these strips one can utilize them as means for joining together the two edges of a sheet of material which is bent to the form desired to construct the horn. In all cases, one can make use of a gum suitable for securing the strips to the material. When one uses celluloid any one of the well known glues or compositions *can employed* to unite it to the metal.

To the small end of the horn, the stylus a^6 is attached, the mounting of which can be effected by the aid of the strips a^5 .

The ends of the horn can be provided with rings or metallic fittings which serve to protect the ends against all accidental fracture.

A horn of this design can be mounted and manipulated in any suitable manner during use. These are details which are beyond the scope of the present application.

By power of attorney of
HOLLINGSWORTH,
BRANDON BROS.